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JOURNAL

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OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH

An Official Quarterly Record of
Information for the Public

MARCH, 1898

Proceedings of the January Annual Meeting

Subject: Rules Suggested for Adoption by Boards of Health for the Protection of Milk Supplies from Pollution — Experiments with Formaldehyde Gas as a Disinfectant

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VOLUME VIII NUMBER 1

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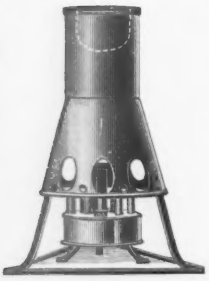

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January Meeting, 1898

SUBJECT: Rules Suggested for Adoption by the Boards of Health of the State for the Protection of Milk Supplies from Pollution — Experiments with Formaldehyde Gas as a Disinfectant

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THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are one dollar and fifty cents.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,— to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, and at Smith & McCance's Bookstore, 57 Bromfield Street, Boston.

All communications to the Association should be addressed to the Secretary, **EDWIN FARNHAM, M.D., City Hall, Cambridge, Mass.**

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JOURNAL OF THE

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

ORGANIZED 1890.

[The Association as a body is not responsible for statements or opinions of any of its members.]

VOL. VIII. March, 1898. NO. 1

JANUARY MEETING

OF THE

Massachusetts Association of Boards of Health.

The January (annual) meeting of the Massachusetts Association of Boards of Health was held at the Parker House, Boston, on the afternoon of Thursday, Jan. 27, 1898. The President, Dr. H. P. Walcott, was in the chair. The proceedings were as follows: —

THE PRESIDENT.— Will the Association come to order, and listen to the reading of the record of the last meeting?

The record was read by the Secretary.

THE PRESIDENT.— Is it your pleasure to accept the record as read to you? If so, it will stand as the record of the last meeting of this Association. The next business in order is the election of your officers. How shall we proceed thereon?

DR. E. A. SAWYER.— Mr. President, I move that a committee of three be appointed by the chair to bring in a list of officers for the ensuing year.

The motion was accepted and adopted.

THE PRESIDENT.— I will appoint as that committee Dr. Sawyer of Gardner, Mr. Pilsbury of Boston, and Mr. Newcomb of Salem. Will they please retire, and make up their list of nominations? While your committee is engaged in this business, will the Executive Committee please meet at this end of the room, in order that we may consider a few items of business that are now on hand? I would also ask if any member of this Association has any additional names which he wishes to present for membership in the Association. If so, I should be glad to have them submitted at once to the Executive Committee.

A brief intermission here ensued.

THE PRESIDENT.— Will the Association come to order, and listen to the reading of the report of the Treasurer, Dr. Field?

The Treasurer's report for the year 1897 was then read by the Treasurer.

TREASURER'S ANNUAL REPORT, 1897.

RECEIPTS.

Balance from 1896	$605.19
Annual assessments	206.50
Total	$811.69

EXPENSES.

Reporting meetings	$141.65
Postage	45.01
Printing	26.80
Cigars and dinner for guests	22.50
Clerical assistance	2.00
Total expenses	$237.96
Balance to 1898	573.73
Total	$811.69

$500 of the balance is in the savings-bank, drawing interest.

Respectfully submitted,

JAMES B. FIELD, *Treasurer.*

Examined and approved as correctly cast and properly vouched for.

J. ARTHUR GAGE, *Auditor.*

THE PRESIDENT.— You have heard the report of your Treasurer. Shall it be received and placed on file? If there be no objection, it will be so received and placed on file. The Executive Committee desires to report to the Association the names of the following gentlemen as proper candidates for election to membership in the Association: —

CHARLES HARRINGTON, M.D.	Boston.
GEORGE M. WHITAKER	Boston.
C. H. HOOD	Boston.
FRED H. SCHAAKE, M.D.	Lawrence.
GEORGE W. SMITH	Lawrence.
H. A. SIBLEY, M.D.	Chelsea.
FRANCIS G. CURTIS, M.D.	West Newton.
E. R. UTLEY, M.D.	Newton.
ROBERT BURNS	Somerville.
GEORGE WHITING	Somerville.
DAVID M. LITTLE	Salem.
GEORGE G. HATHAWAY	Salem.
GEORGE W. MCINTIRE	Salem.
GEORGE A. NEWHALL	Salem.
JOHN K. WHITING	Brookline.

Is it your pleasure that these gentlemen be elected to membership in this Association? If so, you will please signify it by saying ay. [The vote was taken, and the President declared the above-named gentlemen unanimously elected.] Will you now listen to the report of your Committee upon Nominations?

DR. SAWYER.— Mr. President, the Committee appointed to bring in the list of officers for the ensuing year have attended to their duty, and would report as follows: —

OFFICERS, 1898.

H. P. WOLCOTT, M.D., *President.*

S. H. DURGIN, M.D., *1st Vice-Pres.* S. W. ABBOTT, M.D., *2d Vice-Pres.*

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N. HATHAWAY. W. H. GOVE.

THE PRESIDENT.— You have heard the report of your committee. What action will you take thereon?

It was moved that the report be accepted and adopted.

It was moved and seconded that the further consideration of the Amendments to the Constitution be deferred to the next meeting. The motion was adopted.

THE PRESIDENT.— The Executive Committee would further report that the matter brought to their attention at the last meeting by Mr. Brimblecom be referred to the Committee on Legislation. Is it your pleasure that the recommendation of the Executive Committee be agreed to? If so, you will signify it by saying ay.

It was voted that the matter be thus referred.

THE PRESIDENT.— What action will you take, gentlemen, upon this list of officers? [It was moved and seconded that the list be accepted, and the vote was taken.] The gentlemen named on this list have been unanimously elected, and are the officers for the ensuing year.

I beg leave to thank you, gentlemen, for the honor which I have already enjoyed at your hands, I think, too often. I should be very glad, indeed, to be retired from this place, and allow any one of the many other gentlemen who would represent you, I am afraid, more ably than I can, to take my place. The next business upon your programme is the Further Report on Protection of Milk Supplies. I will call upon Professor Sedgwick.

PROFESSOR W. T. SEDGWICK.— Mr. President and gentlemen of the Association and our distinguished guests, you are all aware that this Association has been for some time trying to formulate a set of rules which would look to the betterment of the milk supply of our larger cities and towns. As is often the case, when people undertake improvements, it is easier to undertake them than to carry them out; and that has been found so here. Nevertheless, your committee, after considerable hesitation and a good deal of advice freely solicited and sometimes freely volunteered, has arrived at certain preliminary conclusions. These were stated in the rough at the last meeting, and in the main were adopted by this Association as expressing its desire; but I am sure that I am voicing the feelings of the Associa-

tion, as I know that I am the feelings of the committee, when I say that we realize fully that these rules are tentative and experimental, subject still to criticism and amendment. It should also be borne in mind that they are only suggestions and recommendations to boards of health, and that each board of health may, if it chooses, neglect them altogether, carry them out in part, or adopt them in full.

At the last meeting certain sections were referred back to the committee for amendment and, if possible, improvement; and the committee was also instructed to inquire whether the steps already taken were in line with the statutory law. These things have been looked into, and certain results reached. Before proceeding, however, to state precisely what the results are, I wish to repeat what has been said already several times as to the object of these rules. The object is a very simple one. It is to endeavor to bring the milk supply of modern cities and towns as far as is practicable up to the present standards of sanitary science; and in this respect, as the Association well knows, our ideas have changed within the last fifteen or twenty years very materially. A standard which was good twenty years ago is inadequate to-day; and it is our duty as representatives of the various cities and towns on the sanitary side, and as in a measure guardians of the public health, to endeavor to make action fit theory as far as is practicable, and only so far as is practicable.

The one main object which the committee has had in view all through has been the bringing about of greater cleanness. Everything, I think, may be reduced to that greater cleanness, because greater cleanness is going to mean a better sanitary condition, fresher milk, safer milk. With that in view everything else has been set aside. For example, as you will see, when I proceed to read the amended rules of the committee, it has not been deemed wise or necessary to introduce or attempt to introduce anything which is still seriously under debate,— such, for example as the tuberculin test, believing that, if we undertook to do that, in the first place, we should not be, perhaps, perfectly sure that all members of the Association would agree about the rules providing for the use of tuberculin, and, in the second place, that we should be trying to do something that we have not set out to do. What we are after is to get cleaner,

fresher, purer milk, and not to get milk that is beyond any of the modern reasonable requirements of any city or town or, as we believe, beyond the reasonable ability of any set of people supplying milk. To carry this out, we believe that all licenses for the sale of milk should be brought under the authority of the boards of health. The sale of milk is henceforward to be regarded as a sanitary matter. It is a matter of food supply as much as any other food, perhaps more than any other food, that man has; and it is believed that the boards of health are able to attend to that, and pronounce as to the sanitary condition of the milk, and not, as still is the case in some places, the so-called inspector of milk, not answerable to a board of health in any way.

It was pointed out at the last meeting that, in undertaking to do this and in recommending that boards of health should license milk dealers, and should look after the sanitary condition of dairy farms, the methods of handling milk *en route* and after its arrival in the city, there was danger of a conflict of authority between the inspector appointed by the mayor and aldermen and the boards of health, having separate authority. That fact was pointed out by Mr. Coffey, of Worcester; and your committee was instructed to look into the matter. On looking into it, they find that there is, in fact, danger of some such conflict. We have consulted eminent legal authority, and have been led to believe that there is probably the necessity in some cases — that is, in cases where the inspector is not already connected with boards of health — that there should be special legislation bringing inspectors under such authority. That is not the case in Boston, which has its special statute, but it is the case, I think, still in many cities and towns of the State; and so one recommendation of your committee to-day is that your Committee on Legislation should look into this matter, and endeavor, if possible, to secure the proper legislation, in order that boards of health, the proper and recognized sanitary authority, shall have power, if they choose to do so, to grant licenses for the sale of milk in their respective cities and towns. And, of course, that committee will have to act promptly, because the time for the admission of new business at the State House is limited.

With regard to the other point that was raised, as to the power of the boards of health to make ordinances such as these, and bring

them in line with the ordinary ordinance-making power, there seems to be comparatively little doubt. It is granted that, if there is any conflict between boards of health and the inspector of milk, the power of a board of health to establish these rules governing the milk supply is sufficient. But, before that conflict arises, perhaps it would be well for the Committee on Legislation to look into it.

There are certain verbal changes and errors in the rules as printed in the report, which, I believe, most of the members of the Association now have, as it should have been distributed to them, and I dare say has been.

For instance, in Section 1 it was stated toward the end that application "on forms prescribed by the board, for a permit or license," must be made. It was not said what board. It should be the "Board of Health of said city or town."

The same correction should be made in Section 3. "Local board of health" should be "Board of Health of said city or town." In other words, the conditions under which cows are kept should be made known to the local board of health of the city or town in which the milk is to be sold, not the local board of health in the town or village where the milk is produced.

Section 4 was one which made a great deal of trouble at the last meeting, and your committee is not altogether sanguine that it has got it in good shape now; but the form in which it is presented to you to-day is this: —

"SECTION 4. No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is derived"— that word is "delivered" in the printed form — "unless the cows from which it is derived have within one year been examined by a competent authority, and shown to the satisfaction of the Board of Health of said city or town to be free from diseases dangerous to the public health. But this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin."

In order to prevent all possible misunderstanding, the committee believed that we should exclude the tuberculin test from this set of rules. If the Association desires to take that up later, well and good; but, as I have already said, the object of these rules was primarily to secure greater cleanness and care of the milk. It was

not to prevent the use of milk from non-tuberculin-tested cows; and, therefore, it was thought that, in order to make it perfectly clear, we would say so. I will reread that section, and the Association can then adopt it either now or later. [Section 4 was then reread.]

Then one or two other sections were referred back, and we have taken the liberty of changing Section 2 of Article II. Although it was not referred back to us, we had no right to do so, perhaps; but, as now proposed, it reads as follows: —

"SECTION 2. Milk shall be stored or regularly mixed, cooled, or poured from can to can only in a room not directly connected with a stable or stables, provided with a tight floor, and kept constantly neat and clean, the walls of the room being of such a nature as to allow easy and thorough cleansing." The committee felt that this might be too severe upon some small farmers, so they have qualified it as follows: "or in some room approved by the said Board of Health." So that, if a man came and said that it would be a hardship for him to make a room such as is described, the committee thought it would be reasonable to qualify the rule as suggested,— that the room could be left for the approval of the Board of Health; and, if they should approve it, no undue hardship would be brought about. "Such room shall contain proper appliances for washing" — the former word was "*and* sterilizing"; but, as it is felt that people won't sterilize and cannot sterilize under ordinary conditions, it would be better to say "for washing *or* sterilizing"—"all utensils actually employed in the storage, sale, and distribution of milk in said building, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after having been so used."

There are two versions proposed for Section 4,— one just as it is, and the other which amounts to leaving it just as it is; namely, "some room other than the stable, and not containing any urinal or privy, nor used for sleeping or other domestic purposes." Beyond this the committee was not instructed to go, and has not gone.

I will simply tell you, to repeat what I have already said, that these rules are intended to secure, in the first place, greater care, in the second place, greater cleanness, in the milk supply. The committee felt it very undesirable to bring in any elements which would inter-

fere with those primary and fundamental objects. If we can secure this, we shall be taking a great step in advance.

Finally, I think the committee feels that, after this matter has been disposed of, the Association may well address itself to the preparation of a circular of information which may be distributed to the farmers and others interested in the milk supply, showing how milk becomes contaminated and what sanitarians regard as proper care of milk. It is found that there is a good deal of ignorance on that subject. Sanitarians are thought, on the one hand, to require many things they do not require; and, on the other hand, they are not known to require some that they do ask for. And so in this form I think the committee may safely leave these rules with the Association. Stated somewhat roughly, there is need of more legislation in order to prevent confusion in granting licenses; and, second, there is need for the preparation of a circular of information.

I should like to say, personally, that, after thinking over this thing a good deal, I believe there might well go as a verbal statement from the Association — not to be printed with these rules, of course — the understanding that whatever improvement is made in the milk supply is to come along three lines. In the first place, from the producer, who should clean up, and see to it that the milk is more thoroughly cared for, to start with; in the second place, from the middleman or contractor, who should see to it that the milk is as safely and quickly transported and delivered to the consumer as is possible; and, in the third place, the consumer, whose milk supply has been based hitherto upon a low standard in all these matters, should do his part, and be prepared, if necessary, as I believe it will be necessary, to pay a higher price for safe, pure, and sanitary milk. I think it ought to be very distinctly understood by the Association and by our guests that in all these matters the one desire of this Association is the improvement of the public health. If these rules seem to some to bear hard upon some, it may be due to a misunderstanding or it is inevitable on account of the growth of the science. If it is a misunderstanding, we might hope to clear it up; but the fundamental object of the whole thing must, in any case, be constantly kept in view, and that is to bring the present system of milk supply in Boston and in Massachusetts up to the very highest standard practicable, and to keep it in line with the best sanitary science of the day.

THE PRESIDENT.— The Association has listened to the report of the committee. I presume that the only way in which this Association can intelligibly and intelligently enter upon this discussion would be article by article of this report, but it is simply a suggestion. What action will you take? Possibly, for the information of the Association, it will be well that all the rules should be read. If it is desired, we could then discuss each singly.

PROFESSOR SEDGWICK.— The heading, I think, is very important here,— "Rules suggested by a Committee of the Massachusetts Association of Boards of Health for adoption by the Boards of Health of the State for the Protection of Milk Supplies from Pollution."

ARTICLE I.

SECTION 1. All persons engaged in the production of milk for sale, or in the sale, delivery, or distribution of milk in the city or town of——, shall annually, on or before May 1, make written application, on forms prescribed by the Board of Health of said city or town, for a permit or license.

THE PRESIDENT.— Is it your wish to discuss this report article by article or to have the whole report read to you?

A MEMBER.— Article by article.

THE PRESIDENT.— The first article, then, is before the Association for discussion. I shall be very glad to hear from anybody who has anything to say upon the subject or to ask questions.

DR. MILLER.— Mr. President, I would like to ask one question. Some of these articles were adopted at the last meeting, and some were referred back to the committee. Now, if the chairman of the committee, as he reads these, if he is going to read the whole right along, would tell us which ones he desires the present meeting to act upon, or if there are any changes to be made, I think we should act more intelligently. Of course, those that were adopted at the last meeting do not need to be touched now.

THE SECRETARY.— Article I., Section 1, was accepted.

PROFESSOR SEDGWICK.— Article I., Section 2, Article I., Section 3, Article I., Section 4, were referred back to the committee.

DR. MILLER.— Then Article I., Section 4, would be the first one to consider, wouldn't it?

PROFESSOR SEDGWICK.— Mr. President, we have with us to-day a number of guests representing farmers and representing contractors; and it seems as if so rare a chance were too good an occasion for us to lose to hear from these gentlemen, and to learn whether they have any fundamental objections to any of these rules. And, although we have expected to meet objections, and it is very likely shall continue to do so, yet we should be glad to hear if there is any sound criticism of them, because our one object in all this is, as I have said, the real benefit of the public.

THE PRESIDENT.— I presume it is the wish of this Association to get all the information that it can upon the subject, and we shall be glad to hear anything that may be said upon this matter.

A MEMBER.— Mr. President, it might be that, an article having been adopted, some one present might have some valuable amendment to offer; and, if the articles are not too long, I for one would like to hear them read.

THE PRESIDENT.— We will proceed to do so. Is there anything to be said upon this Article I.?

A MEMBER.— Mr. President, as I understand it, the law distinguishes between milk, buttermilk, and skim milk. Now would it be any object to insert in Article I. "in the production of milk, buttermilk, or skim milk," or add the word "cream"? I ask this question because there are some practical troubles with this matter. Certain ones who sell buttermilk say they are exempt, or would say so; and others who sell skim milk would say the same, and some who sell cream would say the same. It seems to me it is of equal importance to have all these places kept clean.

PROFESSOR SEDGWICK.— That has not been considered. We are very glad of the suggestion.

DR. CHARLES HARRINGTON.— Mr. President, I would suggest that the Supreme Court of Massachusetts has decided that cream and skim milk are milk, so that is not necessary.

A MEMBER.— Mr. President, at the same time the law tells what we should do to protect dealers and those that sell; and in this case it seems to me just as desirable.

DR. HARRINGTON.— Mr. President, that question I have had occasion to ask many times, and I will simply say that those are varieties of milk. It is all milk.

THE PRESIDENT.— As I understand it, there is no motion made to amend.

DR. CHAPIN.— Mr. President, I should like to ask if this includes condensed milk.

THE PRESIDENT.— I do not know how it is in Rhode Island, but condensed milk is covered by special legislation in Massachusetts.

DR. BURR.— Mr. President, there has been a question raised in regard to this section concerning the wording in "the production of milk for sale." I think that there are some of the representatives of the milk producers here who perhaps can give us their view on that particular point; but the question is whether the producer of milk should be obliged to obtain his license for simply producing the milk? As I understand it now, a producer does not have to have a license. The one who sells is obliged to obtain a license: the producer does not have to.

PROFESSOR SEDGWICK.— Mr. President, the intention there was simply to affect a man who produces milk for sale; and I cannot myself see why it is not right to say "all persons engaged in the production of milk for sale,"— that is, not the production of milk for their own families or to supply their neighbors, but in the production of milk for sale. It seems to me that is perfectly clear. If it would make it any clearer to say "all persons engaged in the sale of milk," I think it would cover the same idea, because the man who raises milk and sells it would then be covered by it.

A MEMBER.— I would suggest that it be those "who are engaged in the business,"— let the business be the thing,— "who are engaged in the business of" thus and so.

PROFESSOR SEDGWICK.— The committee does not see that that makes any material difference. It is hard to see how anything can be clearer,— "all persons engaged in the production of milk for sale, or in the sale," and so on. If the Association think that ought to be cleared up, it can be done. It should be understood that this has already been adopted, and the chairman is now simply inviting criticisms. Unless there are pretty sound reasons for change, it seems unwise to depart from it as adopted.

DR. W. P. BOWERS.— One of the prominent producers in our section is here, and he has raised the question where he should get

his license. He wants to know whether, if anybody sends milk to Boston, he should get a license in Boston or in the place where he lives.

PROFESSOR SEDGWICK.— I think that is covered by the words "in the city or town." "All persons engaged in the production of milk . . . in the city or town of" blank. That is, for instance, if a man in Hillsboro Bridge, N.H., if there is such a town, is producing milk for sale in Boston, he does not have to get any license; but, if he is in West Roxbury, which is a part of Boston, he has got to get a license just as much as the man who delivers milk from the railroad station. This does not mean that farmers have not got to pay for a license at all,— nothing of that sort: that would be absurd of course,— but simply, if they are engaged in the production of milk for sale in such a town or in the sale of it in that town. Perhaps the punctuation might be improved, but that was the idea.

MR. GEO. H. ELLIS.— "All persons engaged in the production of milk for sale." I do not see why the Hillsboro Bridge man, who is producing milk for sale, has not got to get his license under that. I think, if the words "production of milk for sale to a consumer" were inserted, that would cover that; and, if the Hillsboro Bridge farmer is producing milk for sale, he has got to get a license.

PROFESSOR SEDGWICK.— It was not the intention of the committee at all. I think a comma after the word "milk" would fix the whole thing. It would then read, "any person engaged in the sale, delivery, or distribution of milk, in the city or town," and so on. The idea is not to license the farmer, but to license the man who sells milk in the city, and then to make him report what the condition of the farms is up in the country; but those farmers are not to be licensed. I do not think that was ever contemplated by the committee.

THE PRESIDENT.— As no motion has yet been made, the chairman of the committee will read the next article.

PROFESSOR SEDGWICK.— "Section 2. No person shall engage in the business of producing milk for sale, or in the sale or distribution of milk,"— and here the comma is in,— "in the city or town of" blank. It seems to be understood that there are farmers as well as milk pedlers in the city of Boston, and this was aimed at them as well as

at the pedlers; that is, if there is a farm in Dorchester or Roxbury producing milk, that farm within the city limits should come under this just as truly as the pedler who takes it from the railroad station. And I think that is covered by this clause,— "in the city or town of —— after April 30, 1898," or any other date, "without a permit or license to do so signed by said Board of Health, and under such conditions as said Board of Health may impose, revokable at the pleasure of said board." That, it seems to me, is perfectly simple,— no person shall engage in a city or town in the business of producing milk for sale, or in the sale or distribution of milk, without a license.

The legal member of our committee says it would be well to have the word "continue" inserted, so that it shall read "shall engage or continue in the business of producing milk," etc., in that city or town; but that was adopted at the last meeting of the committee, and, unless there is a motion to do so, it cannot be changed.

THE PRESIDENT.— Is there anything to be said upon the section just read to you?

PROFESSOR SEDGWICK.— "Section 3. The conditions under which every cow is kept, whose milk is brought into any city or town, or kept, delivered, distributed, sold, or offered for sale, in such city or town, shall be made known to the Board of Health of said city or town in such detail as the board may require, and shall be approved thereby; and no milk except that delivered from such cows,"— "derived" that should be again,— "derived from such cows shall be so brought, kept, delivered, distributed, sold, or offered for sale."

Now that, of course, is the attempt on the part of the Board of Health to get control of the conditions on the farm, but not by licensing. It is simply by requiring a statement or report to be made by the person selling milk in the city or town as to the conditions of the farms from which he derives his milk. That seemed to the committee, if this was adopted, to be without any question a perfectly rational and proper thing to do,— a very different thing from licensing a farmer, simply a means of getting information. Then, if the information shows that the farm is in a wretched condition, very unsanitary, the license of that particular dealer in the city can be cut off; and he would have to get his milk somewhere else.

THE PRESIDENT.— Is there any question to be asked with regard to this section?

A MEMBER.— There is one point I would like to ask about in the first section, where the producer of milk sells to a contractor. Some of the members do not quite understand how, if the producer of milk sells to the contractor, that is to be controlled. If he should sell to the contractor, how is he to be affected?

PROFESSOR SEDGWICK.— Well, so far as it appears on the face of it, it would be like this. The contractor would be a person defined here as selling milk in the city of Boston. He would therefore be required, as a condition of his receiving a license, to make known to the Board of Health, in such detail as that Board of Health might require, the conditions under which every cow supplying him with milk is kept; and he would practically, I suppose, have a blank with which the Board of Health would provide him, which he would mail to every farmer supplying him with milk in the town of Sterling. That farmer would fill it out, giving a statement, for instance, of the position of the privy with reference to the cow-barn, the condition of the stables, how the milk is handled, whether the cans are set just behind the cows while milking is going on, and so forth and so forth. A lot of simple facts like those could be easily filled out by any intelligent producer. The producer would send that back to the contractor, then, as a matter of course, the contractor would return it to the Board of Health, the Board of Health would look it over; and, if they felt it needed inspection, they would send one of their inspectors up there to see if the farm was really what it pretended to be. Of course, at first they could not send an inspector to every farm; but they would go at random to just a few farms, and raise the whole standard. The immediate practical effect would be at first very little; but the ultimate practical effect would be an intelligent inspection by the Board of Health, the inspector from the Board of Health saying to the farmer: "You think you are doing everything nicely, but here are such and such things that are not as they should be. You can see this won't do, and I shall have to recommend that your farm be cut off unless you do so and so." That is only my idea. That is the way I should do it if I was on the Board of Health; and I presume my friend, Dr. Durgin, would do it a great deal better and more reasonably than I should.

The next section is one which occasioned a good deal of debate at the last meeting, and very likely will at this, and was referred back to the committee for improvement. In its original version it was this: "No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is derived have within one year been examined by a competent authority, and shown to the satisfaction of the local board of health to be free from disease." Then the suggestion was made by Dr. Smith — and it seemed to meet with considerable favor on the part of the Association — that this should be changed so as to read in the form given in the report. It was amended to run like this. It was suggested, also, by Dr. Theobald Smith that it should run in this way: "No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is derived have within one year been examined by a competent authority, and shown, to the satisfaction of the Board of Health, to be free from diseases dangerous to public health." I think I have not got that quite right. I think he left out the clause about having been examined within one year. The committee, on going over it, recommends this instead of either of the others, — that it should stand as printed in the report, and go on as follows, the whole reading in this way: "No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is derived have within one year been examined by a competent authority, and shown, to the satisfaction of the Board of Health of said city or town, to be free from diseases dangerous to public health. But this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin." In other words, we set aside the tuberculin matter altogether. Not but that we have our ideas about it, but we did not think it worth while to raise the question of the tuberculin test in connection with this matter of cleanness. We realize there is a strong feeling on the part of farmers against tuberculin. We realize that tuberculin is not such a condition that it is best to put it in here. At least, that is my opinion. Some members of this Association may not agree with us, and think it is best to put it in; but that is the feeling of the committee. We had no other object in view in this matter than the protection of the milk supply, and cleanness in the methods of handling it. So we said we would

not go into the tuberculin test, and therefore added this last clause: "but this shall not be construed as forbidding the sale and use of milk from cows not tested with tuberculin." This section is now presented to you by the committee in that fashion.

A MEMBER (MR. ELLIS).— Mr. President, I agree exactly with the idea set forth by the chairman of the committee, and disagree entirely as to the last paragraph of that section. You do interfere with the tuberculin test by putting that clause in there. Its effect is to say to the boards of health in the local towns that they shall not adopt the tuberculin test in their own town. It seems to me that is just exactly what this Association does not wish to do. It should leave that matter wholly to the boards of health; but, in thus referring to that matter at all, you are introducing the tuberculin question. If you leave that clause out, it gives the board of health an opportunity to adopt the tuberculin test, if it desires to do so.

A MEMBER.— Mr. President, as one member of the committee, it was my understanding, when this clause was originally drafted without the test, that that was intended,— that, while we did not feel like providing explicitly for the tuberculin test, we proposed to allow local option in the matter, and let the local boards of health require it or not, just as they saw fit. I think the question of making this amendment is a mere question of expediency. If it is necessary to say explicitly that this is not to condemn the requirements of the tuberculin test, in order that it may have the support of those who do not like the tuberculin test, and object to it as a matter of expediency, then it is well to adopt it. If that is not necessary, I should prefer to let it stand as it was originally, so the boards may use their own discretion in the matter.

DR. BURR.— Mr. President, I should like to read a bill which has just been presented to the legislature, which gives each town the right to call for tuberculin, and under which each town can prohibit the sale of milk within its limits excepting from cows which have been tested with tuberculin. I think it is pretty safe to say this bill will be defeated. At any rate, I think within forty-eight hours there will be a bill in opposing that; and I have no doubt, if this Association leaves out that last clause, that there will be a bill in a very short time which will prevent boards of health using tuberculin.

THE PRESIDENT.— This section apparently brings in a very wide view of the whole question; and the Association, fortunately, has among its guests to-day a number of gentlemen prominently connected with the production of milk, and we shall be very glad to hear from them. I shall be very glad to hear from the Hon. C. A. Gleason, chairman of the Cattle Owners' Association.

HON. C. A. GLEASON.— Mr. President and gentlemen of this Association, I received the invitation to be here this afternoon with a great deal of pleasure; and it gives me especial pleasure to say a few words, although I do so with some hesitation as I meet this learned and distinguished gathering from all parts of Massachusetts. I have been interested in the milk question all my life. I have taken quite a large part in its production and in its sale here in Boston. I have listened with a great deal of interest to the remarks of Professor Sedgwick, and I have admired the candor and ability with which he has discussed the subject. I should agree most fully with all things that have been said. I believe that I represent an Association who would be heart and hand in delivering Boston pure, clean milk up to the legal standard. I presume a large number of this Association fully comprehend that, in order to do that, there is considerable effort and some skill required on the part of the producer. I presume most of the members, or many of them, understand that under existing circumstances, with the price of milk netted the farmers, it is a struggle for them to maintain an existence in many of the hill towns, and produce milk for the Boston market. Many of you know that there has been a good deal of agitation, a good deal of dissatisfaction, with the price obtained; but they all thought, "We stand here as an Association, believing that a good article of food is the only article that should be produced and sold here in the Boston market."

Now it seems to me that it is only reasonable that all due care in cleanliness should be used on the part of the producer to send such an article to the Boston market. So far as I know, a large majority of the producers are men who send good goods here. I am just as well aware that there is a certain per cent. that is produced among the producers of New Hampshire, Massachusetts, and Con-

necticut, that finds its way into Boston, that is not produced and cared for under the best conditions. I have seen nothing in this bill so far, until this discussion arose on the tuberculin question, that I should object to, and nothing that the producers of Massachusetts, either the New England Milk Producers' Union or the Farmers' and Cattle Owners' Association, would object to. I might say that for seven years I have been president of the New England Milk Producers' Union; and my place has this last week been taken by an able representative of the producers from Concord, Mr. Patch, who is here, and, I presume, would be glad to say a few words on the subject. That is an association that represents nearly all of the producers that send their milk into the Boston market. The Association that I represent more particularly here to-day is a much smaller Association, confined entirely to Massachusetts, but representing a large number of cattle owners; and we are deeply interested in this milk question, because our profit largely comes from the production of milk. We are a large company of producers, and we are working hand in hand, so far as we can, with the contractors of Boston to make a better quality of milk; and I want to say right here that the quality of milk that the consumers of Boston are receiving has improved very largely within the last ten years. The public demands it, and the conditions must be improved. The contractors insist upon it, and they are a greater power in carrying it out than any board of health can be. The cutting off of a dairy by the contractors will induce improved sanitary conditions better than any rules that can be passed here to-day. I think the contractors are the greatest power for the improved quality of milk that we can have; and I am glad to say, as they will say to you to-day,—they will bear me out in this statement, I am sure,—that the milk which was furnished in Boston ten years ago would not be received, much of it, to-day. I think that this, as has been suggested by the chairman of the committee, can be largely done by education. I am glad that these rules that have been presented are mild, because I feel that, if there was anything that seemed to be arbitrary, there would be so much opposition shown and manifested that it would be unpleasant, if not difficult, to enforce them.

But I would be glad to say one word here on the question of

tuberculin. I suppose that there is a wide difference of opinion upon that; but I think it would be very unwise, from my view of it, representing the large number of farmers that we do here to-day in the Association, to leave it an open question at least whether the Board of Health of Boston and other cities were to insist upon the tuberculin test. There is a very strong feeling, and it is getting stronger every day, that it should not be insisted upon; that the cattle that are producing milk for the Boston market should not all be tested with tuberculin. I can safely say, and I feel sure, as has been intimated here, that, if it was felt that this meeting to-day was going to insist upon it, this question would be carried from this room at once to the State House; and I think that there would be an increased interest over the question compared with what there was three years ago, and I should hope that these rules might be adopted by this Association in the form that they have been presented rather than the tuberculin test should be left in dispute.

Thanking you, gentlemen, for this opportunity, I am very glad to have met you here this afternoon.

THE PRESIDENT.— The Association would be very glad indeed to have Mr. Patch address us upon this subject.

MR. PATCH.— Mr. President and gentlemen, I do not think I can add very much to what the Hon. C. A. Gleason has already said; but I believe that the milk producers of New England are hand in hand to produce a good article of milk to be delivered in the city of Boston, without going to any unreasonable expense in so doing. I believe, if they could feel that they would be compensated for producing a better article, they would be ready and willing to do it, a large majority of them; but I do not think that they would be willing to be compelled to have all their cattle tested with tuberculin, and I for one would hope that this resolution might be adopted as it has been read instead of leaving it open for discussion.

THE PRESIDENT.— The honorable ex-president of the Cattle Owners' Association has called attention to the contractors. I am sure we have no better or more acceptable specimen of a contractor than Mr. Whiting, and I hope he has something to say on the subject.

MR. WHITING.— Mr. President and gentlemen, I feel very much complimented in being invited here to-day. The subject under consideration is one in which I have been interested throughout my business life; and, as I was saying to Professor Sedgwick, many of the suggestions and recommendations made by your honorable board are very encouraging, as they are along the lines that we have always contended were of great importance to the milk business in general. For more than thirty years we have urged upon our farmers the importance of being more cleanly and more systematic in the care of their milk. We have urged that it could be done without any more trouble or expense, and, in short, that uncleanliness is only a bad habit.

I do not mean to insinuate that the farmers (many of them at least) are not willing to do what is right, when made to see it; but they are very much inclined to think that any invasion upon their old traditional customs is unnecessary and only an additional burden imposed upon them by their wicked contractors. In fact, as some of you know, they feel that we are responsible for about all of their woes; while we, on the other hand, try to show them that they are indebted to us for most of their blessings. Be that as it may, there is great opportunity for improvement without injuring or causing unreasonable expense to any one. There are so many good suggestions in your last report that I hardly know where to begin the discussion of them.

As Professor Sedgwick has said, there can be no hardship in cleaning up the cow stables; and the best farmers will not object to it, and those who do object should be compelled to do it.

I think the quality of the milk brought to Boston market is much better than it was ten or fifteen years ago; and, while we have many complaints from farmers that the standard is too high, yet I believe we are gradually working up to it, and every year it is being accomplished with less friction. Dr. Harrington, as you know, is doing good work in his department. We think he is pretty rigid sometimes, — possibly, a little unreasonable; but from personal experience we feel confident that he shows no partiality. I am a firm believer in the idea that whatever is really desirable for the promotion of any good cause or object can be accomplished if approached in a business-like and reasonable way.

The farmers feel that they are not receiving money enough for their milk, and I am inclined to agree with them.

And I will go a step farther, and say that I don't know of any one in the business who is getting enough or what he really ought. Now one way that the farmer is going to get more for his milk is by your assistance in getting better prices for it here, in convincing the consumers that, if they want a really good article of milk, they must be willing to pay for it. You cannot get something for nothing, which seems to be the desire of too many milk consumers in Boston.

One of the best suggestions that I have seen in your report — one which, I believe, if adopted, would result in the best good to the business generally — is the licensing of milk distributors. If the sanitary condition of milk is of so much importance to the health of a city or town, why should a man be allowed to engage in the delivery of it until he can show to the proper authorities that he has conveniences for doing the business in a decent and sanitary manner? In the first place, a man to engage in the business should be a man; and the absence of this condition would prevent many applicants. He should have facilities for doing his business, such as suitable cans, a respectable-looking team, and all the conveniences for caring for his milk while in his possession. In addition to this, let him pay a good license,— say a hundred dollars,— that will keep out a low class of milk dealers, who go into the business only for what they can make by cheating and defrauding honest dealers.

Men who intend to be square will not object to such a license; and it would materially help Dr. Harrington in paying the expenses of his office, and possibly save some poor innocent from suffering. In order to give a farmer more for his milk and encourage him to raise better milk, all the waste places must be stopped; and we, as contractors, feel that we are partly entitled to all the influence of a healthful public sentiment and reasonable laws.

We want your assistance in enforcing proper sanitary conditions among the farmers. We can work together in accomplishing this much needed improvement, for it is the fountain-head of the whole milk problem. Good milk can never be made from poor milk.

To my mind, the ideal way of carrying on the milk business in Boston — and one which, I think, may come in use, to some extent,

before long — would be to have the milk brought to the city in large cans, the cans to be owned by the contractors. I would then filter the milk, — a process which, I am sure, would make it more cleanly, — and by cold-air process cool down to forty degrees, then put it up in cans or bottles, as required by the trade, after which I would replace in cold-air storage instead of the innumerable ice-chests used at present, some of which, I fear, are not any too clean. This plan would necessitate large storing and cooling capacity. But it would have the advantage of making the milk of uniform quality; and the cleansing and thorough cooling would, I am sure, improve the flavor and keeping qualities of the milk. It would also insure a prompt return of the cans to the farmers, as they would never go beyond the milk depot; and, by using this sized can, the number would be so much reduced that I think they could be hastily rinsed, and thus do away with much of the complaint of washing dirty cans. Another advantage would be that it could be made an attractive place for consumers to visit, and see for themselves where and how their milk is cared for. It would be imitating somewhat the plan adopted by Mr. Ellis, which, I am happy to say, is the best I have ever seen: he seems to accomplish everything in the care of his milk in a perfectly simple and natural way.

I should like to make a little addition to some of your rules which you have recommended. I think it would be of material assistance to the business. I have drawn up the following in connection with Section 1. I only added a few words. The section reads like this: —

"All cans, bottles, or vessels of any sort used in the sale, delivery, or distribution of milk to the consumer, must be plainly marked with the name of the owner of the milk route from which said milk is delivered, and must be cleaned or sterilized by the milk dealer before they are again used for the same purpose."

It seems important to me that each person handling milk should be held responsible for the part that he takes in it. If a man leaves milk at the door of a house, his name should be on the can, so that, if there is anything wrong about it, the trouble can be located. It would also assist in ferreting out complaints of constant thieving, not only of cans that are empty, but of cans that are full; for, while

a man is not obliged to have his own name on the can, if he can use anybody's can, it is a very easy thing for him to go to a door where these cans are set out at three or four o'clock in the morning, and take them. This expense alone is a very serious one.

I am happy to pledge the support of the contractors in assisting you in any scheme that will promote the general interest of the milk business.

THE PRESIDENT.— The last word will never be spoken upon this subject — here, at any rate — until we hear from perhaps the most competent representative of the other side of the question, to whom this community owes a very great debt, and to whom this Association will listen with the greatest attention. That is Dr. Harrington, of Boston.

DR. CHARLES HARRINGTON.— Mr. President and gentlemen, the ground has been so well and thoroughly covered that I feel that there is very little left for me to say. I do not propose to say anything about the tuberculin test. There have been enough hearings at the State House to show that it is not advisable to do anything further about that at the present time, but I want to say that I am heartily in sympathy in the movement for obtaining a supply of clean milk. I think it may fairly be said that our supply of milk is pure enough, so far as adulteration goes; but I think it is very necessary that we should obtain a cleaner supply. Now much can be done, it seems to me, by the rules and regulations suggested and by legislation, and a great deal can be done by educating the public sentiment a little more in the line of clean milk. I think the consumers are very much to blame for the fact that our milk supply is not cleaner. They do not insist on having a cleaner supply. I believe in having the milk clean when it is milked, and kept clean until it is put on the consumer's table. Our milk supply is subjected to more or less uncleanliness at its point of origin. It is subject to more or less while it is in transit. It is then subjected to a considerable source of contamination while it is in storage, and it is this last source which the public could very easily avoid if it only knew enough to insist upon it. Our milk supply in Boston gets in here early in the morning and during the forenoon. If the milk could

then be distributed to the consumer, it would be in a great deal better condition than when it is distributed. The milk is carried from the railroad, where it is received, to the various stables of the delivering milkmen. Now I have taken the trouble to go around and examine all the stables in Boston where milk is kept and handled prior to its delivery to the customer; and, as a rule, the conditions in Boston are very good. I also examined the stables in the outlying towns, the stables of milkmen delivering milk within the city; and with some exceptions their condition was very good, or at least fair, and some of them were in a disgraceful condition of filth. Now there is no necessity of having this milk stored in any of these places, whether they are clean or filthy. The milk may just as well be delivered when it gets in Boston, but the public won't have it. If a milkman should address a circular letter to his customers, stating that on and after that date he was going to deliver milk at eleven o'clock in the morning, he would lose all his customers, because they would say: "We don't want it delivered so late as that. We want milk delivered early. We want it fresh." And so the milkman is obliged to send this milk, which they want fresh, which comes in by the railroad at eleven o'clock, and store it in his stable in his refrigerator, which, as Mr. Whiting has said, is never strictly clean; and then the next morning at six o'clock it is delivered right fresh from the cow [laughter], and during this time it has had every opportunity to acquire new filth, and also to form a considerable multiplication of the bacteria that are already in the milk when it is sent down.

Mr. Gleason has touched on a point where I think I can cordially indorse him; that is, on the power that the contractor has in assisting in this movement for pure and clean milk. Whether there are or are not regulations, the contractor has the right, and would undoubtedly exercise it, of shutting off the milk supply from any dairy where the cows and surroundings are not kept in a good sanitary condition; and it would be only necessary, it seems to me, in some cases, if the contractor should insist upon that, that they would not receive milk unless it was clean.

As to whether the contractors and farmers get all they ought to for their milk, I do not know. It has always seemed to me that the

contractors did fairly well. They seem to be in a reasonable state of prosperity, and it always seemed to me that the farmers did not get quite all they ought to have. I do not want to precipitate a discussion on that point; but I think, if the farmers knew the power that they might have if they should go out on a strike, they would get more money for it.

A MEMBER.— Do you keep cows, doctor?

DR. HARRINGTON.— Two.

THE PRESIDENT.— With regard to the last suggestions of Dr. Harrington as to cleanliness of the milk supply, Mr. Walker has, as I understand it, an improved milk-pail which we would be glad to hear about. I do not know but Mr. Walker would be glad to say something about it in a word or two.

MR. F. H. WALKER.— Mr. President and gentlemen, I am pleased to be accorded the privilege of attending this meeting as a guest, and to have the additional privilege of stating a few facts regarding the Climax Milk Pail, and results obtained from its use.

This device is a pail equipped with cover, funnels, and strainers in such a way that the milk, in its passage from the cow into the pail, must go through these strainers. The pail is also supplied with hooks, which support it on the milker's knees.

I agree with Mr. Whiting and Dr. Harrington that more care should be exercised at the very beginning. In fact, I believe, like the young lady school-teacher who took a refractory urchin over her knee, in going to the bottom of things.

I am positive, after careful investigation and trial, that the use of the Climax Milk Pail will accomplish certain results along the lines of convenience and cleanliness. It will not change milk drawn from a diseased cow into a first-class, pure article. It has nothing to do with the after condition of milk, caused by pouring or repouring into dirty cans or those requiring sterilization. It will not prevent the

spread of contagious diseases, such as typhoid and scarlet fever, when the milker is afflicted with one of these diseases. It is not offered as a solution of the milk problem in its entirety, nor as a cure-all. It does, however, accomplish more than the practice of grooming the cows, and in much less time. Careful grooming is a splendid thing, but very few people are disposed to take upon themselves this extra work. Yet, with the utmost precaution taken, hairs and other articles will drop into the open pail. The Climax Milk Pail cover keeps out of the milk, during the process of milking, dirt, hairs, and pieces of cow manure, which latter sometimes give a peculiar flavor to the milk.

In accomplishing what it does, the pail supplies a long-felt want; and it is perfectly amazing to me, gentlemen, that a device of this kind has not before been put on the market. If puddings, pies, and other foods, prepared in our homes, were exposed to contact with foreign matter, as is milk in the open pail, many of us, I fear, would be loath to partake of them. The continued use of the open pail is of course largely a matter of habit. To quote from Lord Lytton, with but little change, "Use and habit are powers far greater than the dictates of common sense in this world of ours."

At the Boston Food Fair last October, where the pail was first shown and where several hundred were sold, it attracted not only the attention of the every-day farmer, but was also personally shown to many in all walks of life, business and professional. Ninety-nine out of every hundred, I am certain, were favorably impressed with the device. Knowing, therefore, that public opinion — that average opinion of the people in which President Lincoln reposed the utmost confidence — indorses it, I hope to see it generally adopted. The pail is retailed at a reasonable figure, and the price is not a fancy combination one.

Upon investigation I find that devices of the general nature of the Climax Milk Pail are not unknown to the Patent Office; but on account of complex and complicated parts, and various silly notions embodied in their construction, these articles could not be produced at a reasonable price, and were, therefore, not put on the market. Some of the devices were as complicated as a Corliss engine, and decidedly impractical.

I am heartily in favor of rigid inspections, and of keeping clean and sweet all places of storage and all cans used for the reception of milk, also of Pasteurization of milk, if this is found beneficial and necessary. I believe that those practical, educated, and thinking men who are contributing so much time, study, and discussion to the better care and inspection of milk are doing a grand work. But inspection, however rigid it may be, will not accomplish everything. It ought to, and I hope will in the future, compel a more proper care of milk, stable, and surroundings. It is a fact, however, that inspection and experience born of inspection have done but little to prevent foreign substances from entering milk in the open pail. The idea has been to strain them out afterward. An ounce of prevention is certainly worth more than a pound of cure.

THE PRESIDENT.— Is there any gentleman here who wishes to say anything further about Section 4? We shall be very glad to hear from anybody, whether a member of this Association or not.

A MEMBER.— Mr. President, we have a gentleman here from Pittsburg who has been very active in the Farmers' Association, Mr. Harrington; and I should like to hear from him.

THE PRESIDENT.— We shall be glad to hear from Mr. Harrington.

MR. HARRINGTON.— Mr. President, I am a common farmer, a born hayseed. So you must not expect from me any words of wisdom. I have been for some years secretary of the Farmers' and Cattle Owners' Association, and I am certainly glad to see this movement in the line of cleanliness in milk production. I would say that our Association, as has been said by our president, Mr. Gleason,— that, in all reasonable matters bearing upon the production of clean, wholesome milk, the Cattle Owners' Association of Massachusetts is with the boards of health. There are some things which enter into this matter from a producer's standpoint which perhaps, as boards of health, we are apt to forget. In the first place, it must be realized that farmers at the present time are producing milk for the Boston market at next to nothing, if anything, above the cost. In fact, I firmly believe that just now milk for the Boston market is being produced by the farmers at less than cost.

The vast majority of the farmers of Massachusetts are holding on, hoping for better times and better prices, and are producing milk now at an actual loss, with a hope that in time they may better their condition. At a Farmers' Institute, only last week, it was demonstrated without a shadow of doubt that the cost of production was above the price received at the railroad station. Now we all wish to produce better milk; and, while we are willing to put forth every effort possible, the boards of health, I hope, realize — I believe they realize — that the condition imposed upon the farmers must imply very little added cost at the present time. Perhaps more can be done in the line of education than in the line of legislation. I believe the farmers are willing to come up to a better standard just as fast as they can or as fast as they realize the absolute necessity of it; but it must also be remembered that the vast majority of people,— as has been said, I think, by Dr. Harrington, of Boston,— a vast majority of people look at the cost rather than the quality. I sell my milk in the Pittsburg market, and I know that nine-tenths of the people in the city will look at a cent a quart before they will at the better quality of the milk.

Mr. Whiting.— The question under discussion, I believe, is whether this Association shall leave the tuberculin test optional with boards of health or whether they shall plainly state their position. Now the Farmers' and Cattle Owners' Association was organized primarily to oppose compulsory tuberculin. They oppose it. Compulsory tuberculin is a thing of the past. I am sure it will never again be required by the State of Massachusetts. I believe, if the Association here will pass the resolution that has been offered by Professor Sedgwick, just as it has been offered by him, that the Farmers' and Cattle Owners' Association, if there is legislation needed,— and there doubtless is,— is willing to go before the legislature and help in passing just such a bill. Last year there was passed also a bill which gave to the boards of health just the power which is in this resolution, minus the tuberculin provision. Our society added a proviso practically like the suggestion presented by Professor Sedgwick. That suggestion was not accepted by those who promoted the bill, and we defeated the bill. So, I think, it is safe

to say that we defeated the bill. I know that to be a fact. Our Association went before the Committee on Agriculture. We looked up the members of the legislature, and a bill was reported. The promoters were given leave to withdraw. Now, if this Association will declare itself one way or another on this matter, the Farmers' and Cattle Owners' Association are ready to work with the boards of health in any way which will promote health, which will promote wholesome food, and which will promote clean milk. We stand unutterably committed on the question of tuberculin.

THE PRESIDENT.— Is there anything further to be said on this subject?

DR. SMITH.— I think that this Association should not leave the subject here without taking some position upon the subject of tuberculin. I do not mean to say that tuberculin should be compulsory throughout the State; but I think, as a scientific organization, we at least should not turn our backs completely upon a diagnostic agent which is just now beginning to increase in its use in the medical profession, on account of the delicacy of this diagnostic subject in proving tuberculosis. It seems to me that putting in a clause that tuberculin should not be used would imply that the Local Boards of Health of Massachusetts are doubting the value of tuberculin; and I think this is a serious mistake. At the present time I believe that there are men in the State who have their cattle tested, and who try from time to time to rid themselves of tuberculous cattle. However, that is done at present at the expense of the State; and, therefore, it is difficult to see how there is any difference between those men and the men who do not have their cattle tested. It seems to me that, if there are men in this State who will take upon themselves the personal expense of having their cattle tested, and having the affected cattle weeded out, this Association ought to give those men its heartiest support, and recommend its policy voluntarily. I mean that this body, as a scientific organization, should not consider tuberculin as a useless agent, when it is making progress throughout the world. To-day in Germany, for instance, it is used more than it was two or three years ago, and it will continue to be used; but I am not at all so sure that ten years from now it will

not be used in Massachusetts. I am not at all sure that it will not be asked for by prominent men who are handling cattle. I think that time is coming; but I think it must come, of course, through co-operation of those who have charge of those animals.

DR. MILLER.— Mr. President, it seems to me that we can do no better than to adopt that article as just read by the chairman of the committee. It is impossible for every one here to-day to study it exactly, and I therefore move that the article be adopted as read by the chairman of the committee.

THE PRESIDENT.— Mr. Ellis has previously moved, if I understand him, that this article be amended. What is your pleasure with regard to the amendment proposed by Mr. Ellis?

PROFESSOR SEDGWICK.— Mr. President, if I may say one word in further explanation, I should like to say that I do not believe that this clause commits the Association pro or con. It simply sets this thing aside. It says certain things as printed already, and adds, "this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin." It does not say that it is not a good thing to test cows with tuberculin. It simply says, if a man brings milk to the city, and is asked, "Have your cows been tested?" that the milk shall not be excluded because the cows have not been tested. It does not say that the Association does not believe in tuberculin or anything of that sort, and it has been very carefully arranged with that in view. I grant, as Mr. Ellis holds, that it seems, or might seem to any one reading it, to minimize somewhat the value of tuberculin. Personally, I am quite willing to take that stand. I do not feel that tuberculin is to-day in such a state that this body as a scientific Association, as Dr. Smith has said, needs to take any positive stand one way or the other on that matter; and I cannot see how this phrase, that "this shall not be construed as forbidding the sale or use of milk from cows not tested," throws any more than a very slight doubt on tuberculin. I think that it does throw such a very slight doubt; and I think that doubt is justified by the present state of the tuberculin question, so that I do not think that this organization will be facing backward if it takes this stand. It simply sets the thing aside: it says, for our present purpose, we shall not exclude milk from untested cows. I dare say, if this Asso-

ciation should take a vote, it would say, on the whole, it thought it well to test cows; but, in the present state of the question, it sets the whole thing aside, and throws only that very slight shadow which I have spoken of upon the use of tuberculin. I hope the resolution will be carried as it stands, because I believe greater good will be done by adopting it than by defeating it. As I understand the matter, it is not that these gentlemen, representing the Milk Producers' Union, Cattle Owners' Association, and so on, make any threats. It is not that. Nor are we afraid of any threats, if made; but simply forgetting the greater good we are willing to set aside, for the time being, and put out of consideration, the question of tuberculin-tested cows as milk producers.

MR. ELLIS.— Mr. President, it seems to me that is just exactly what is done. I am still obtuse enough not to see that question as the chairman of the committee does. It seems to me that without it, if you leave the whole matter in the hands of the local boards, you leave it exactly where a stand can be made without this Association expressing its opinion. If the Cattle Owners' Association care to, they can go before the legislature, and have some special act with reference to the tuberculin test. That has nothing to do with this. That does not affect this question at all, but this is putting this Association on record against the tuberculin test or it has no effect.

THE PRESIDENT.— Is anything more to be said upon Mr. Ellis's amendment? If not, all those in favor of the amendment proposed by Mr. Ellis will signify it by saying ay. [The vote was taken.] The chair believes it to be a vote: it is a vote. The section that "this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin" is stricken out.

PROFESSOR SEDGWICK.—Mr. President, I voted under a misapprehension. It is possible others may have done the same. Dr. Durgin was talking to me, and by mistake I voted for Mr. Ellis's amendment.

THE PRESIDENT.— I am afraid one vote would hardly make any difference. The vote was not doubted.

A MEMBER.— I beg to doubt the vote.

DR. MILLER.— Mr. President, I think if you would read it, we could all understand it better.

THE PRESIDENT.— The question is upon Mr. Ellis's motion to strike out the words, "but this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin." The question is now whether those words shall be struck out. All those in favor will please rise and stand until they are counted. [The vote was taken.] It is not a vote. The question now is upon the adoption of the article as reported by the committee. All those in favor of adopting the article as reported by the committee will say ay. [The vote was taken.] It seems to be carried by a unanimous vote. The next article with regard to which there is any amendment is Section 2; and, as I understand it, that was adopted at the last meeting, but it is now proposed by the committee to add to it a few words, which, I understand, are simply in the way of definition.

PROFESSOR SEDGWICK.— Section 2. This was adopted, as the President says; but it is proposed by the committee, voluntarily proposed on their part, to give a loop-hole for the men who cannot possibly afford a really good room, and to insert after the word "cleansing" "or in some room approved by the said Board of Health."

THE PRESIDENT.— Is it your pleasure to amend this article by adding these words, which do not change the sense of it? If you are so minded, will you please signify by saying ay? [The vote was taken.] It is adopted.

The next section amended or, in fact, not accepted at the last meeting of this Association is Section 4, which originally read, "All milk directly after it is drawn from the cow shall be at once taken to, and be at once filtered, cooled, and stored in, a room such as is described in Article II., Sections 1 and 2." The committee now propose that it shall read, "All milk directly after it is drawn from the cow shall be at once taken to, filtered, cooled, and stored in, some room other than the stable, and not containing any urinal or privy, nor used for sleeping or other domestic purposes."

DR. DAVENPORT.— Mr. President, if the chair will allow me a question, I did not quite hear back here just what that means. I would like to know whether it means that cans can be in the barn and milk poured into the cans after it is drawn from the cow and then removed, or that the milk-pail filled up full must be taken imme-

diately to the barn or some adjacent room. Now that would make quite a difference in the expense and work of the farmer, as I understand by that clause. If it means every pail full of milk shall be carried from the stable before it is deposited in the cans, why, it means quite a heavy burden upon the farmer. If it means that it may be placed in the cans and the cans removed, why, that is quite a different thing. I should like an interpretation on that.

THE PRESIDENT.— I will ask the chairman of the committee to inform him.

PROFESSOR SEDGWICK.— This was the suggestion of only one member of the committee. As I understand it, the idea was that it was a bad thing to have cans standing near the tails of the cows, perhaps with open mouth, and it would contribute to general cleanliness if the man, after filling the pails, were to go into the next room and empty the milk there. Of course, if that involves very serious hardship, the committee might be willing to reconsider the matter; but it does not seem the proper thing to have the can behind cows, as it often is in the stable, and it does make more space needed. But, if the room were provided, as it should be, and then separated a few feet from the barn or from the stable, I do not know that it would be very serious, hardly more than to walk across from the yard to the place where the cans were set.

DR. DAVENPORT.— Mr. President, I should like further to know from you, not to invite trouble here, how that is to be done in a room. Would it not be well that it be done out of doors, to add to the word "room" "space"?

PROFESSOR SEDGWICK.— There is a qualifying clause,—"or some place approved by the Board of Health." If a man can show it is better to do it out of doors, I do not think there would be any trouble on that.

THE PRESIDENT.— It is moved and seconded that the section as originally read stand as the opinion of this Association. What is your pleasure thereon? All those in favor will signify by saying ay. [The vote was taken, and the motion was declared carried.] The only other section referred to the committee, on which I understand that no action has been thus far taken, is Section 2 of Article V.

PROFESSOR SEDGWICK.— Mr. Chairman, in regard to Article IV., I think the suggestion of Mr. Whiting is very good. His suggestion is this: "All cans, bottles, or vessels of any sort used in the sale, delivery, or distribution of milk to the consumer, must be plainly marked with the name of the owner of the milk route from which said milk is delivered, and must be cleaned and sterilized by the milk dealer before they are again used for the same purpose." In other words, he introduces this to facilitate keeping cans clean. One of the greatest abuses is dirty cans, which arises under this system of trading cans and stealing cans, and all that sort of thing. It seems to me that would be a very good suggestion,— to change Article IV. He also suggests on this type-written sheet, "It shall be deemed a sufficient reason for forfeiture of license for any milk dealer to fill or use in any way a milk vessel for any other purpose than milk." I am sure it would be a good thing if it was understood to be a sufficient reason for the forfeiture of a license if the vessels were used for any other purpose than for milk. I think these are very valuable suggestions from Mr. Whiting, and I move that both of them be incorporated in Article IV.

THE PRESIDENT.— Is it your pleasure that Article IV. be amended by introducing the words and sentences read to you by Professor Sedgwick?

A MEMBER.— Mr. President, I would like to amend that by changing one word,— "must be cleaned *or* sterilized."

PROFESSOR SEDGWICK.— Well, Mr. President, in this case it is the milk dealer who is concerned; and he ought always to have a place where he can do the work properly. I do not think there would be a great deal of trouble arising in the city between the contractor and consumer; and it would not be felt to be a hardship there to keep the word "and," while in the case of the farmer who had not reasonable apparatus it might be a real hardship. I do not care to insist on it, however, because I suppose practically he never will really get it thoroughly sterilized; but I do not think it is too high an ideal for the man who sets up milk in his stable, near the tails of his horses, to try to rise to. I think that is where a great deal of trouble comes in, as Dr. Harrington has intimated also. These fellows who get milk from the contractor take it home, work it over, and set it by in

ways that are not at all desirable. Their cans might well be sterilized. I do not think it will be any great hardship for them to do it. I hope the time will come when that work will be done, and that milk will be kept where the horses' tails are not within ten or twelve feet of the setting-up process.

A MEMBER.— What is meant by sterilizing in this case?

PROFESSOR SEDGWICK.— It means the destruction of all germs.

A MEMBER.— That is, what is the method?

PROFESSOR SEDGWICK.— Whatever means may be necessary to accomplish it.

A MEMBER.— I think still it would be a hardship for the small country dealer in a small country town.

PROFESSOR SEDGWICK.— That is a point I am ready to admit. If that is true, I withdraw my objection. I think this Association is too apt to think of the Boston system. I grant the value of that suggestion, and am quite ready to make it "or" in the case of smaller towns.

DR. BURR.— I think the most of these bottles may have come from some house where there has been diphtheria or scarlet fever. I think that was why it was insisted on that the dealer should sterilize his cans which had gone to the consumer.

THE PRESIDENT.— Will you amend this section as suggested by Professor Sedgwick?

PROFESSOR SEDGWICK.— In regard to Dr. Burr's remark, he refers to what is really a serious matter, especially in the bottle trade, which has come in more and more. Bottles are left now in the Boston system, bottles are left at the houses of the consumer; and they may have been taken right into the room where people are sick with diphtheria or scarlet fever, just because they are attractive and instead of some other dish. They are then delivered to the milkman the next morning; and, as Dr. Burr has said, the committee felt that they ought to be sterilized largely on that account. That is undoubtedly a coming way for the spread of disease; but, if it is true, as the gentleman says, that it would be too great a hardship in the smaller towns to have the bottles sterilized, I do not care to insist upon it, but it seems to me that in time it ought to be done.

THE PRESIDENT.— The question, then, is upon the amendment

substituting the word "or" for "and." Is it your pleasure that the substitution be made? If so, you will signify by saying ay. [The vote was taken, and the amendment was declared adopted.] That finishes the general consideration of the portions of the articles and sections that were referred to your committee. Is it your pleasure now to adopt them as a whole, and instruct some proper committee to procure the necessary legislation to see that they go into effect?

PROFESSOR SEDGWICK.— Mr. President, I move that the Committee on Legislation be instructed to secure such modification of the existing law as shall be necessary to carry these recommendations and suggestions into effect.

The motion was seconded by Dr. Miller. The vote was then taken, and the motion was declared carried.

RULES SUGGESTED BY A COMMITTEE OF, AND RECOMMENDED BY, THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH FOR ADOPTION BY THE BOARDS OF HEALTH OF THE STATE FOR THE PROTECTION OF MILK SUPPLIES FROM POLLUTION.

ARTICLE I.

SECTION 1. All persons engaged in the production of milk for sale, or in the sale, delivery, or distribution of milk, in the city or town of ——, shall annually, on or before May 1, make written application, on forms prescribed by the Board of Health of said city or town, for a permit or license.

SECT. 2. No person shall engage in the business of producing milk for sale, or in the sale or distribution of milk, in the city or town of —— after ——— without a permit or license to do so signed by said Board of Health, and under such conditions as said Board of Health may impose, revokable at the pleasure of said board.

SECT. 3. The conditions under which every cow is kept, whose milk is brought into any city or town, or kept, delivered, distributed, sold, or offered for sale, in such city or town, shall be made known to the local board of health of said city or town in such detail as the board may require, and shall be approved thereby; and no milk except that derived from such cows shall be so brought, kept, delivered, distributed, sold, or offered for sale.

SECT. 4. No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is derived have within one year been examined by a competent authority, and shown, to the satisfaction of the Board of Health of said city or town, to be free from diseases dangerous to public health;

but this shall not be construed as forbidding the sale or use of milk from cows not treated with tuberculin.

SECT. 5. All persons having a permit or license to sell, deliver, or distribute, milk in any city or town, shall keep a copy of the same constantly posted in a conspicuous place on premises and vehicles from which milk is sold or distributed or in which milk is kept or delivered.

ARTICLE II.

SECTION 1. No milk shall be kept for sale or distribution, or handled, transferred from can to can, or stored, in any stable or similar place or in any room used in whole or in part for domestic or sleeping purposes.

SECT. 2. Milk shall be stored or regularly mixed, cooled, or poured from can to can only in a room not directly connected with a stable or stables, provided with a tight floor, and kept constantly neat and clean, the walls of the room being of such a nature as to allow easy and thorough cleansing; or in some room approved by the Board of Health of the city or town in which the milk is to be sold or distributed. The room aforesaid shall contain proper appliances for washing and sterilizing all utensils actually employed in the storage, sale, and distribution of milk in said building, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after having been so used.

SECT. 3. No urinal, water-closet, or privy, shall be in the aforesaid room or any room directly connected therewith.

SECT. 4. All milk directly after it is drawn from the cow shall be at once taken to, and be at once filtered, cooled, and stored in, some such room as is described in Article II., Sections 1 and 2.

ARTICLE III.

SECTION 1. Milk kept for sale in any store, shop, market, bakery, or other establishment, shall be always kept in a covered cooler, box, or refrigerator, properly drained and cared for; and while therein shall be kept tightly corked or closed, and only in such location and under such conditions as shall be approved by the local board of health.

ARTICLE IV.

SECTION 1. All cans, bottles, or vessels of any sort used in the sale, delivery, or distribution of milk to the consumer, must be plainly marked with the name of the owner of the milk route from which said milk is delivered, and must be cleaned or sterilized by the milk dealer before they are again used for the same purpose; and it shall be deemed a sufficient reason for forfeiture of license for any milk dealer to fill or use in any way a milk vessel for any other substance than milk.

ARTICLE V.

SECTION 1. Every person engaged in the production, storage, transportation, sale, delivery, or distribution of milk, shall immediately, on the occurrence of any case or cases of infectious disease, such as typhoid, scarlet fever, or diphtheria, either in himself or in his family, or amongst his employees or within the building or premises where milk is stored, produced, sold, or distributed, take care that the local board of health is notified of such case or cases, and at the same time suspend the sale or distribution of milk until authorized to resume the same by the local board of health.

SECT. 2. It shall be unlawful for any person suffering from a contagious or infectious disease, such as typhoid fever, scarlet fever, or diphtheria, to handle, transport, deliver, mix, taste, work over, or distribute milk, or to be in or about places where milk is stored, sold, or distributed, or to serve as a milker or milkman. No vessels which have been handled by persons suffering from such diseases shall be used to hold or convey milk.

THE PRESIDENT.— The next business upon the programme is "Remarks on the Use of Formaldehyde by Dr. Parks of New York, Dr. Brough of Boston, and others." Dr. Parks, of New York, is not here; and I understand some one will read his paper.

Mr. Charles E. Davis, clerk of the Boston Board of Health, then read Dr. Parks's paper, as follows: —

EXPERIMENTS WITH FORMALDEHYDE GAS AS A DISINFECTANT.

BY E. M. PARKS, M.D.,

BACTERIOLOGIST OF THE NEW YORK BOARD OF HEALTH.

At the suggestion of Dr. H. M. Biggs, I undertook, in March, 1897, a series of experiments for the purpose of testing the value of formaldehyde gas as a disinfectant for health department purposes. Later Dr. Arthur R. Guerard, assistant bacteriologist to the department, joined me in carrying on the work. The investigations were made in the health department laboratories of the city of New York, and the most important conclusions reached may be summarized as follows: —

1. *Disinfection of infected dwellings.*

The interior of dwellings may be superficially disinfected by means of formaldehyde gas, all apertures being tightly closed, when employed in the proportion of not less than 1 per cent. by volume strength (that is, by the evaporation, in a suitable apparatus, of six ounces of the 40 per cent. solution of formaldehyde per 1,000 cubic feet of air-space), the time of exposure to be not less than two hours.

Under these conditions the common, non-spore-bearing pathogenic bacteria are surely and rapidly destroyed, when freely exposed to the action of the gas. Spore-bearing bacteria are not thus, as a rule, destroyed; but, as there is no need to use a disinfectant which will destroy spores, except in rare cases, such as anthrax, and as in these special methods can be carried out, this is of little practical significance in house disinfection.

The penetrative power of formaldehyde gas, under the conditions ordinarily existing in house disinfection, is extremely limited, even when used in double the strength above mentioned, and with a very much longer exposure. Articles, therefore, such as bedding, carpets, upholstery, etc., should be removed to a disinfecting station

for disinfection by steam, hot air, or formaldehyde gas, in chambers specially constructed for the purpose. If this is impossible, the materials to be disinfected should be as thoroughly exposed as possible, and for at least six hours, to the gas.

2. *Disinfection of bedding, carpets, upholstery, clothing, articles of leather, books, etc.*

These may be disinfected by formaldehyde gas in the ordinary steam-disinfecting chamber, the latter to be provided with heating and vacuum apparatus and special apparatus for generating and applying the gas, which should be used in the proportion of not less than 10 per cent. by volume strength, the time of exposure to be not less than eight hours. In order to insure complete penetration of the articles to be disinfected, they should be so placed as to allow a free circulation of the gas around them; that is, in the case of bedding, clothing, etc., they should either be spread out on perforated shelves or loosely hung up. The addition of moderate heat (110 to 130 degrees Fahrenheit), with or without the aid of a partial vacuum, greatly facilitates the operation, the presence of a vacuum not being so important, apparently, as that of heat.

For the disinfection of upholstered furniture and other articles requiring much space, a very large chamber, or, better, a room which can be tightly closed and heated up to at least 100 degrees Fahrenheit, is to be recommended in place of the ordinary chamber.

In the disinfection of books it would be necessary to have the leaves kept open, so that the gas could pass through them, for which purpose a special apparatus might be devised. Shelves do very well, with books lying separate and on end.

Articles of clothing, etc., may also be disinfected on a small scale by spraying them with a solution of formaldehyde (40 per cent.), and then hanging them in an air-tight chamber for twelve hours.

3. *Disinfection of ambulances and other conveyances.*

Ambulances and other conveyances which can be *tightly* closed may be disinfected by means of formaldehyde gas, when used in the proportion of 10 per cent. by volume, the time of exposure to be not less than one hour. No gaseous disinfectant, however, is applicable to the disinfection of conveyances *which cannot be tightly closed.*

4. *Comparative merits of the various methods tested of generating formaldehyde gas.*

(*a*) The generation of formaldehyde gas by means of lamps, directly by the oxidation of wood alcohol, though simple in its application, is not to be recommended for disinfection, so far as our experience teaches, in such work as is carried on by health departments, for the following reasons: the yield of formaldehyde gas is uncertain; it is not devoid of danger from fire; it is rather expensive.

(*b*) The method of generating the gas from solid formaldehyde (trioxymethylene pastils), as proposed by Schering, is simple, convenient, efficacious in small rooms, and comparatively inexpensive. The multiplication of lamps, however, which would be necessary for use on a large scale, renders it impractical. Moreover, it has the objection of all lamps which are left burning unattended in a room,— the possible danger of fire. The simplicity and convenience of this method, nevertheless, commend it particularly for use on a small scale, either for deodorizing or disinfecting purposes.

(*c*) The Trillat system of disinfection is excellent in many respects. It is efficacious and reliable. The chief practical objections to its use are that the apparatus, being constructed to withstand a high pressure, is heavy and cumbersome, and not without danger, that it is complicated and requires constant care and attention, and that it is quite expensive.

(*d*) Lastly, the method, as *now* employed by the Sanitary Construction Company, of passing through a heated copper tube the formalin solution, is simple, easily managed by any one, devoid of danger, and convenient for transportation. It is still, however, more or less liable to get out of order and require repairs. We have lately found that the tube for the passage of the gas from the hot copper coil should be wide throughout, and should be a poor conductor of heat. This allows of increased production of gas, and lessens its deterioration in the tube. It is efficacious, and is the least expensive when the apparatus is to be frequently used. The apparatus, however, should be carefully constructed, and the operation properly attended, in order to obtain constant results.

5. *Comparative cost of apparatus and of production of formaldehyde*

and sulphur-dioxide gas per 1,000 *cubic feet of space, to be superficially disinfected as in dwellings. As used by us, it was as follows:* —

(1)	*Lilly Lamp* (large size):	
	Cost of apparatus	$60.00
	Cost of disinfection per 1,000 cubic feet	.25
(2)	*Schering's Disinfector:*	
	Cost of apparatus	3.00
	Cost of disinfection per 1,000 cubic feet	.21
(3)	*Trillat Autoclave:*	
	Cost of apparatus (now reduced to about $60)	100.00
	Cost of disinfection per 1,000 cubic feet	.11½
(4)	*Sanitary Construction Company's Apparatus:*	
	Cost of apparatus	25.00
	Cost of disinfection per 1,000 cubic feet	.07½
(5)	*Sulphur Fumigation:*	
	Cost of apparatus	.03
	Cost of disinfection per 1,000 cubic feet, by burning sulphur, 3 lbs to 1,000 cubic feet	.08

Our trials have been made at temperatures between 50 and 110 Fahrenheit, in hospital wards (30,000 cubic feet), in dwellings, and in tight chambers. Typhoid, diphtheria, and staphylococcus cultures were employed. Thick and thin threads were used. The thin threads were always sterile after disinfection, except on window-sills and just in front of doors. The thick cords were frequently not sterilized completely by the methods of room disinfection above described.

In a word, we have found formaldehyde much better and less destructive than sulphur, though subject to some of its limitations, especially in the slowness of its penetration.

At this point the President, Dr. Walcott, retired from the meeting; and Vice-President Dr. S. H. Durgin presided during the remainder of the meeting.

THE PRESIDENT.— There are other papers and remarks to be made upon this same subject, and we will defer the discussion until we have heard the other papers. The next will be by Dr. Brough, of Boston.

THE USE OF FORMALDEHYDE IN HOUSE DISINFECTION.

BY DAVID D. BROUGH, M.D.

These series of experiments with formaldehyde gas were undertaken at the request of the Board of Health of the city of Boston. The objects of the investigation were to find, if possible, the value of formaldehyde as a germicide for surface disinfection, its powers of penetration, and what reliance could be placed on its general application as a practical disinfectant in house disinfection such as occurs in the routine of health work. The first experiments were undertaken during the summer months, with especial reference to its germicidal qualities; and the second series in the fall had especial reference to the amount of the gas that it was necessary to generate to accomplish satisfactory results.

The experiments were all made in the various houses of the city that required disinfection on account of their having contained cases of contagious disease. The diseases for which disinfection was performed were scarlet fever and diphtheria. No selection was made in the rooms. They were taken as they came, from day to day, and were scattered over various portions of the city. Most of the rooms were in the poorer class of tenements in the central and densely populated areas of the city. Most of the tests were made in single or double rooms. A few occupied the whole suite.

The apartments were prepared for disinfection in the following way. Closet and wardrobe doors left open, drawers of bureaus and chests partly opened. The bedding, bedclothes, and wearing apparel loosely spread out or hung up to present as much surface as possible to the action of the gas. The crevices of the windows, cracks of doors, fissures about walls and flues, were closed by covering them with strips of gummed paper. This paper comes in rolls, is about two inches wide, and is very convenient and easy to handle. It closes the crevices very effectually, and prevents the escape of a large amount of gas that would otherwise occur.

The gas was generated from the ordinary 40 per cent. aqueous solution of formaldehyde. The apparatus used for generating the gas was the autoclave, manufactured by the Sanitary Construction Company. In the first series of experiments the autoclave was left in the room and the room sealed as the gas had commenced to be discharged and it was seen that the apparatus was working properly. The amount of gas to be generated was known by the amount of alcohol in the lamp beneath the autoclave which was used for heating the solution. In two of the first series the gas was passed into the room by means of a rubber tube and brass pipe inserted into the keyhole. The amount of solution in the cylinder at the commencement and at the end of the experiment was carefully measured.

At first, a small amount of calcium chloride was mixed with the solution of formaldehyde; but later the aqueous solution of formaldehyde alone was used.

The materials used in making the tests were silk threads and squares or strips of gauze, which had first been carefully sterilized by heat. They were then allowed to soak in freshly prepared twenty-four hour pure bouillon cultures of the organisms to be tested. After the threads and squares of gauze had been thoroughly saturated with the organisms, they were allowed to dry in the incubator at a temperature that would remove the moisture, but not interfere with the vitality of the organisms. The tests were all made with dried cultures, as this is the condition in which we would ordinarily meet them in the rooms requiring disinfection. In the dried condition the organisms are supposed to be more resistant to the action of germicides.

The bacterium regularly used was the bacillus of diphtheria. Other organisms, the staphylococcus aureus, typhoid, and anthrax, were occasionally used; but the diphtheria was used alone in the larger majority of cases. It was chosen because it is the most frequent known bacterium for which disinfection is required and the pathogenic organism most commonly met with. It represents a type of pathogenic organisms that have a fairly good resisting power to the action of germicides, and stands for a fair average of the non-spore-bearing pathogenic bacteria.

These threads and squares of gauze were taken to the apartments

to be disinfected, and distributed in various parts of the room just before the gas was allowed to escape. The outside door was sealed with paper strips, and allowed to remain closed for the usual period of from five to six hours.

Control cultures to prove the presence of the bacillus were made in every case. This was done by selecting one of the test threads or squares of gauze from among those to be used before the others were placed in the room. The bouillon was always carefully sterilized and tested before being used. The controls generally gave an abundant growth in from 12 to 24 hours.

At the end of the allotted time the room was opened. The gas was usually present in such an amount that it was impossible to enter at once. After a few minutes' airing it was possible to enter and get the threads, this gas causing only a temporary smarting of the eyes and irritation of the nose and throat. The threads were then picked up with sterilized forceps and placed in bouillon, which was brought to the room, or then placed in sterilized test-tubes and placed in bouillon in the laboratory. Possibly, placing them direct into the nutrient bouillon removes any slight degree of contamination from transfer.

The culture tubes were placed in the incubator at 37 degrees Centigrade, and allowed to remain for 72 hours or more. They were examined every day, but the results were only drawn from presence or absence of growth at the end of 72 hours. It frequently happened that no growth would appear at the end of 24 or 48 hours, while at the end of 72 hours there would be a very abundant growth of the organism. This would show that the organisms on the surface had been killed, but that those that were more deeply imbedded in the thread had not been destroyed, and regained their vitality as they were gradually soaked out under the influence of the bouillon. Whenever a growth appeared in the bouillon either in 24, 48, or 72 hours, a secondary culture was made on blood serum, and the preparation examined microscopically to prove conclusively the nature of the growth.

The materials and media for making the tests were kindly furnished at the bacteriological laboratory of the Harvard Medical School by Dr. Ernst; and to him and his assistant, Dr. J. W. Coolidge, I am deeply indebted.

The first series of experiments were made during the months of June, July, and August, 1897.

EXPERIMENT I. Room, 1,136 cubic feet, 32 ounces used. Exposure was for 5 hours. 24 serum tubes were freshly inoculated with pure cultures of staphylococcus aureus, diphtheria, anthrax, and typhoid. At the end of 72 hours there was growth present at the bottom of all the tubes, while there was none at the top.

II. Room, 1,204 cubic feet, 2 windows, 1 door. Dried cultures on silk threads of anthrax, aureus, diphtheria, and typhoid. These threads were placed in the bottom of sterilized test-tubes, and distributed in various positions of the room. The tubes were all placed upright. Exposure was for 5 hours, and 32 ounces of the gas were used. At end of 72 hours all the organisms gave abundant growth except the typhoid. This apparently poor result is to be explained from the fact that the formaldehyde and air being of about the same specific gravity, a cushion of air formed at bottom of the tubes and prevented the gas from gaining access to the threads.

III. Room, 1,144 cubic feet, 32 ounces used. Aureus, anthrax, typhoid, and diphtheria on 8 dried threads used. These tubes were placed in the horizontal position, and the threads placed near the outer end. No growth in any except the anthrax.

IV. In this and the subsequent experiments the bacillus of diphtheria alone was used. 20 dry threads of diphtheria. Room, 1,352 cubic feet, 3 doors, and 2 windows; regenerator placed in centre of the room; room closed for 5 hours; amount, 32 ounces. Threads placed as follows: 5 on various parts of the floor; 2 on chairs; 1 thread, 15 feet long, from ceiling to floor; 4 in one layer sheet; 2 in pockets of clothes; 3 between mattresses; 3 between pillows. Result, 72 hours: 4 on floor, sterile; 1 on floor, growth of non-pathogenic organism; 1 on chair, sterile; 1 on chair, growth of non-pathogenic organism; 2 in sheets, sterile; 2 in sheets, growth of diphtheria bacillus; 1 long thread from ceiling to floor, sterile; 2 in pockets, sterile; 3 between mattresses, growth diphtheria bacillus; 3 between pillows, growth diphtheria bacillus.

V. Room, 900 cubic feet; 8 diphtheria threads; exposure 5 hours; amount, 32 ounces. Result: 2 on floor, sterile; 1 on chair, sterile; 1 loosely wrapped in blanket, sterile; 1 in trousers' pockets, sterile; 1 between pillows, growth diphtheria bacillus; 1 between 2 mattresses, growth diphtheria bacillus; 1 in centre feather pillow, growth diphtheria bacillus.

VI. 5 dried squares of gauze, with diphtheria bacillus. Room, 594 cubic feet, 2 doors, 1 loose flue; room closed for 6 hours; amount, 28 ounces. Pieces of gauze placed in various portions on the surface. Result: 3, sterile; 2, growth of non-pathogenic organism, a spore-bearing bacillus.

VII. 6 dried squares of gauze with diphtheria. Room, 2,002 cubic feet, 2 doors, 2 windows; amount, 48 ounces; room closed 6 hours. Result: 1

placed in wardrobe, sterile; 1 placed on floor, sterile; 1 placed on top of bedstead, sterile; 1 placed in fold of sofa, growth of diphtheria bacillus; 1 placed between 2 mattresses, growth of diphtheria bacillus; 1 placed in 4 folds of quilt, growth not pathogenic.

VIII. 7 squares of linen cloth, with diphtheria bacillus. 2 rooms adjoining, with a capacity of 2,079 cubic feet, 2 windows, 1 door; rooms closed for 6 hours. Result: 1 placed in bureau drawer, sterile; 1 placed on floor, sterile; 1 placed on mantel, sterile; 1 placed on table, sterile; 1 placed in dressing-gown pocket, sterile; 2 placed between mattresses and pillows, growth of diphtheria bacillus.

IX. 9 threads and squares of cloth. Room and closet, 1,494 cubic feet; room closed for 6 hours; amount used, 32 ounces. Result: 3 placed on top of mattress, sterile; 1 placed on top of bedstead, sterile; 1 placed on top of pillow, sterile; 1 placed on floor, sterile; 1 placed on floor, growth slight of diphtheria bacillus; 1 placed on top mattress, growth not pathogenic.

X. 11 dried diphtheria threads. Room, 700 cubic feet, 1 door, 1 window; room closed 6 hours; amount used, 25 ounces. 3 placed on floor, sterile; 3 placed on top pillow, sterile; 3 placed in centre pillow, growth; 2 placed between mattresses, growth.

In this first series of experiments the results were practically harmonious in every case. Out of the 45 threads and squares of gauze used in testing the disinfection of surface in the right rooms, 39 were absolutely sterile, 5 gave growth of non-pathogenic organisms, 1 gave growth of diphtheria bacillus, showing that in more than 97 per cent. the diphtheria bacillus was killed when exposed to the action of the gas; and the result was same, whether the exposure was 5, 6, or 7 hours.

Of 9 threads placed almost superficial, such as wrapped loosely in sheets or placed in pack, 6 were sterile, and 3 gave growth.

Of the 17 threads used in testing deep penetration, such as placing between mattresses or pillows or in the centre of feather pillows, there was a growth in every case.

The average temperature of the days of the tests were 72 degrees Fahrenheit.

The amount of solution used was 27 ounces to the 1,000 cubic feet. There was in several of the experiments some calcium chloride used; but this amount was not measured, and the average amount of the pure solution would be somewhat less.

The conclusions that can be drawn from these expriments are: —

(1) That formaldehyde gas is a practically complete surface germicide.

(2) That it has very little or no penetrating power.

The next series of experiments was undertaken during the months of October, November, and December. These tests were carried on under practically the same conditions as those done during the summer. Rooms were of the same general class of tenements. The Sanitary Construction Company regenerator in the first form, and also in a new form, was used, with a coil of pipe under the cylinder, through which the solution of formaldehyde passed and became vaporized. The gas was introduced by the brass pipe passed through the keyhole. The exposure in all except one case was for five hours from the time the gas commenced to be discharged. The tests were silk threads on which diphtheria bacilli had been dried. Conditions were the same as in the previous series of experiments. The second series of experiments was undertaken with a view of finding out the relation between the amount of gas generated and the amount of sterilization accomplished. It was claimed that small amounts of the material would accomplish the same results as larger amounts, and some tests were made with this in view. Some twenty-one rooms were used. The tests were entirely for superficial disinfection; and the test threads were placed in various portions of the rooms, on the floor, mantles, etc.

The following is a summary of the results in some of the experiments made during October, November, and December. The results are simply an average of the amount of the gas that was used in the various rooms.

I. 5 ounces to 1,000 cubic feet; 12 diphtheria threads. Result: growth in every case.

II. 6 ounces to 1,000 cubic feet; 12 diphtheria threads. Result: growth in every case.

III. 9 ounces to 1,000 cubic feet; 9 gauze strips. Sterile, 1; growth, 8 to 6 were of non-pathogenic organisms.

IV. 10 ounces to 1,000 cubic feet; 5 diphtheria threads. Sterile, 1; growth, 4.

V. 11 ounces to 1,000 cubic feet; 7 diphtheria threads. Growth in every case.

VI. 11½ ounces to 1,000 cubic feet; 5 diphtheria threads. Growth in every case.

VII. 11½ ounces to 1,000 cubic feet; 10 diphtheria threads. Sterile, 9; growth, 1.
VIII. 12 ounces to 1,000 cubic feet; 8 diphtheria threads. Sterile, 2; growth, 6.
IX. 14 ounces to 1,000 cubic feet; 8 diphtheria threads. Sterile, 7; growth, 1.
X. 13 ounces to 1,000 cubic feet; 8 diphtheria threads. 2, sterile; 6, growth.
XI. 18 ounces to 1,000 cubic feet; 5 diphtheria threads. Sterile, 4; growth, 1.
XII. 19 ounces to 1,000 cubic feet; 6 diphtheria threads. Growth in every case.

Several tests were then made by increasing the amount to about 30 ounces to 1,000 cubic feet, with the result that sterilization was accomplished in practically every instance. The only exceptions were in two instances, where, with an average of 30 ounces to the 1,000 cubic feet, the results failed to be satisfactory. As these two cases were performed on very cold days, when the temperature was below 35 degrees Fahrenheit, the only inference that could be drawn was that the temperature had considerable action on the gas, as the other conditions were the same. The influence of the temperature appears to me to have considerable influence on the action of the gas. During the summer there was a good result, with larger amount in every case in rooms of the same character as in the fall. The only conclusion that can be drawn from these experiments is that under 11 ounces to the 1,000 cubic feet the action of the gas is very inefficient. From 11 to 20 ounces to the 1,000 cubic feet the results are very unstable, sometimes satisfactory and sometimes the reverse. With larger amounts the results are far more constant. The fact that the results with the same amounts with different observers differ so much may depend on three factors: (1) the amount of leakage; (2) the influence of temperature; (3) the relative amount of humidity or moisture.

The settlement of these three questions will very much increase our knowledge on the properties of formaldehyde. So far as our experience goes, we would draw the following general conclusions from our experience with formaldehyde.

(1) That formaldehyde gas is a very efficient and practical germicide for superficial disinfection.

(2) That its penetrating power under ordinary conditions is very slight. For deep penetration it has practically no value.

(3) That larger amounts give much more constant and satisfactory results than small amounts.

(4) That, other things being equal, the gas acts better at fairly high temperatures than at low. It also apparently gives better results in warm, dry rooms than in those that are cold and damp.

(5) That its action does not seem to depend on the length of exposure. In five hours' exposure the results were the same as for a longer period.

It may be here noticed, in conclusion, that the gas is not so innocuous to animal life as some writers have stated. While no experiments were made with this in view, it was observed that all the flies were invariably killed, and generally the bed-bugs. One dog and two cats, which were accidentally left in the rooms of different houses, and exposed to the action of the gas, were found dead when the rooms were opened.

THE PRESIDENT.— We shall be very glad to hear from Professor Harrington.

PROFESSOR CHARLES HARRINGTON.— Mr. President, I have done in the past few months more or less in the way of experimenting with formaldehyde, using it in different forms and with different lamps. My experience is that very much depends upon the conditions of the room,— that it is not so much how much formalin is used or how many pastils of formalin, but how much ventilation is going on all the time. But, experimenting in practically air-tight chambers, I found that three ounces of a 40 per cent. formalin solution will kill any kind of bacteria that are exposed in two hours and a half, and with larger amounts bringing it down to fifteen minutes and thirty minutes. But that is all in an enclosed space where ventilation does not occur. I experimented first in a room of 7,500 feet capacity, where night and day natural ventilation went on, and used about two quarts of formalin, and left the room for twenty-four hours. At the expiration of that time almost everything that had been put in as a test object where exposed was killed, and a test culture taken from parts of the room,— in the cracks and floor,— in addition to the bacteria that I introduced myself, was killed; but, then, substances

which were protected and substances that were moist escaped very largely. Then I went into another room of over 10,000 cubic feet capacity, and used pretty nearly four quarts of formalin, of 40 per cent. formalin, and left the room locked for the same length of time, — twenty-four hours; and in the morning so much ventilation had gone on, in spite of the fact that every ventilating outlet had been closed, that there was no trouble at all on entering the room. In other words, most of the formaldehyde had escaped, and only two or three of the test objects that had been introduced were killed. I repeated that experiment in a small room where there was opportunity for natural ventilation, by reason of the fact that a lot of steam-pipes went through it, which raised the temperature of the room very much, and with the same experience there, and then experimenting in other rooms that were closed with double windows, and only a single door, which could be stopped with a wad of cotton at the bottom, with gum labels pasted over the keyholes, and got results which were practically the same as those in a glass cabinet. And, from all the experiments which I carried out, I came to the conclusion that formaldehyde was a first-rate disinfectant for the service of disinfection, but not for any penetrating effect. It will penetrate in some instances; but its action in this way is such that one can hardly say the chances are so great that it will not penetrate that it can hardly be safely used with the idea that it will penetrate. I did succeed in killing typhoid and streptococcus inside the mattress; but with the same organisms were imperfect spores, very highly non-resistant, pathologically considered, and they were killed, although side by side with the other organisms. And we succeeded in killing these same organisms on paper enclosed in cotton bags, using cotton such as is employed in making flour-bags, which is pretty full size; but even then we were not always successful in killing them. So that still further confirmed me in the opinion that it was not a good penetrating disinfectant. I used all sorts of lamps. The lamp of the Sanitary Construction Company seemed to me rather faulty, in that the tube was so likely to clog; and, also, it takes such a long time to disseminate the gas. I think I got my best results with the formaldehyde in pastils, using the Schering lamp. It seems to me that that method has the advantage over the other, in that it is very

simple to apply. I do not think that it can be applied with danger from fire, because it is nothing but an alcohol lamp. The lamp itself is a basket that holds the pastils; is non-inflammable, being made of iron. There is nothing for the lamp to ignite, and it can only act on the pastils. Of course there is a slight possibility of danger, but it is so slight that it seems to me to be disregarded: whereas, in using the autoclaves under pressure, it seems to me, there was more or less danger of possible explosion. Anyway, I know that every time I got through using one without having it explode I felt very much gratified. The advantage, also, in the Schering lamp seems to me to be that, after you have lighted the lamp and shut the door, your work is done, so far as your presence being needed. You light your lamp, shut the door, and go away, and, when the lamp is burned out, the operation ceases: whereas, if you are using an autoclave, you may have to stay by it, or have somebody else, for a matter of two or three hours. The first time I used the Sanitary Construction Company lamps, I began about twelve o'clock and knocked off at six,— and then I had only used about four hundred cubic centimetres,— and started in the next day with the lamp, after it had been properly fixed, and began at twelve, and got through somewhere about seven. And, if a man has a number of places to disinfect, it seems to me the element of time comes in there.

It is true that the pastils are rather expensive. I think they are something like $7 a dozen, and you have to use two for every 35 cubic feet of space; but there is another form of paraformaldehyde which is put on the market that is very much cheaper. It has some imported name which for the moment has escaped me. They are now using it at the City Hospital in place of pastils, and I am informed they get equally good results but for the cost of the pastils.

Then another element of expense is the original cost of the lamp. I suppose that autoclaves will be very much reduced in price, but this lamp that one uses with the Schering pastils costs only $7.50; and there is no particular reason why it should cost more than a dollar, so far as any work involved in its construction is concerned. There is no reason why you cannot use an ordinary lamp, with iron or copper gauze to hold the pastils.

The conditions of moisture certainly play a great part in the success of disinfecting with formaldehyde. I have tried to sterilize surgical dressing. I have taken comparatively dry dressing and pretty moist ones, soaked with pus, side by side, and have killed all the organisms in the dry dressing in a very short time, and have succeeded only in killing those on the very surface of the wet dressing after an exposure of 10, 12, and 24 hours; and I think it is safe to say that, where there is any appreciable amount of moisture, your agent is going to kill only on the surface, and no distance whatever away from it.

I do not know, Mr. President and gentlemen, of anything else that I can suggest at the present time.

THE PRESIDENT.— Dr. Chapin, of Providence, has experimented with and studied this question to some extent. I should be very glad to hear from Dr. Chapin.

DR. CHAPIN.— Mr. President, I cannot add anything to what has been said. I have not been uniformly successful; and, from what has been said this afternoon, I understand pretty well why I have not. It is because I have not used enough formalin. I have used for years the Sanitary Construction apparatus, and found it worked pretty well. Although it does get out of order and get stopped up, we have exercised a little mechanical ingenuity every two or three days to keep it in working order; but I have not used usually more than eight or thirteen ounces per 1,000 cubic feet, and the result has been I have succeeded during that time in sterilizing satisfactorily. I cannot see that the length of the exposure had anything to do with it, but the tightness of the room has a great deal to do with it. If you are going to use that apparatus, it is necessary to put a covering over the door. The keyhole is pretty small, but it is large enough for odor to pass through. Dr. Schwartz has a contrivance to prevent that, which he will show you.

THE PRESIDENT.— We have been looking for Dr. Schwartz. I am glad to hear he has got something for us.

DR. SCHWARTZ.— I feel a little shy on the subject, and did not know I was to be called upon; but I suppose what Dr. Chapin refers to is a screw-driver, very small in size,— a very useful utensil

to carry in the pocket. With it you come to the keyhole, and screw in the door-knob; and, I suppose, pull the door inward or remove the door-knob without making a hole in the door.

THE PRESIDENT.— These papers are open to general remarks and discussion. It is one of the most interesting subjects that we could have brought before the Association, and one about which we are asked more questions than almost any other. I hope that members of the boards of health who have questions to ask will now ask them, so that gentlemen who are competent to answer may favor those gentlemen with their answers.

MR. BRIMBLECOM.— Mr. President, I would like to ask Dr. Brough if any record of any of the tests was made as to the consequence after seventy-two hours had expired.

DR. BROUGH.— Yes, I got them all.

MR. BRIMBLECOM.— Were they examined?

DR. BROUGH.— Examined those which were kept for about two weeks or ten days. Those that were sterilized had no growth. Occasionally, we have a growth of mould, nothing more.

MR. BRIMBLECOM.— I wanted to make that point clear, because we found at Newton that cultures that were sterilized at the end of three days sometimes had a growth at the end of six days.

THE PRESIDENT.— Have any other gentlemen any other questions to ask or any other remarks to make? There must be those here who have experimented with this disinfecting agent, and I know that there are a great many here who want to ask questions about it. Mr. Taylor, wouldn't you like to make some remarks concerning any defects that have been mentioned?

MR. TAYLOR.— No more than to say we have simply the improved apparatus, and have overcome most of those defects. I do not think perhaps I had better say anything.

THE PRESIDENT.— I will call on Dr. Brough to close the discussion.

DR. BROUGH.— I have nothing to say, except, when we used the machines, it usually took about an hour to an hour and ten minutes to get a sufficiently large amount of gas through the keyhole. We now use the Sanitary Construction apparatus, and we usually have twenty-five to thirty ounces an hour pass through the keyhole when

used. As regards the difference between wet cultures and dry cultures, I see Dr. Parks and some men in New York have had experiments with them, and they claim the gas would act a great deal more easily on wet cultures than it would on dry; but my experience has only been with dry cultures. I do not use wet at all.

PROFESSOR HARRINGTON.— Mr. President, in all the experiments that I made, using cultures, they were always wet; and I think they are more difficult to kill than dry. But what I mean in speaking of wet dressing is there is a chance for gas to penetrate, if wet, and to get at the organisms under the surface; and that would not do it, but, when they are dry, I think it might.

There is one other thing I wanted to speak of; and that is the use of calcium chloride with the formalin as recommended with the French autoclaves. I understand that they advocate the use of calcium chloride to prevent the formalin from being polymerised; but it does not prevent it. If you boil a little formalin with a small piece of chloride calcium, it will all polymerise, and I do not quite see the sense of using it in the machine.

THE PRESIDENT.— I would like to ask Professor Harrington if he has used the formalin as a disinfectant or tested its value at all by evaporation in closed rooms?

PROFESSOR HARRINGTON.— Yes, I did that in one instance by diluting formalin with water, and then boiling it cautiously. I could get rid of every bit of it without polymerisation; and it seems to me possible, therefore, to apply that on a large scale. I have mixed four litres of formalin with three of water, and put the mixture in a copper tank holding about ten litres, and then boiled it with a gas stove; and the next day, when I opened the room, I found in the tank, — of course, I had to have some means of shutting it off and knowing how much there was left in the tank, so I had a glass gauge, and could see from the transmitter how high it was, and, when it showed me it was down to the bottom of the gauge, I shut off the gas. Then the next day I went in, and found a little over a quart left in the tank; and it was rather mushy from the polymerised formaldehyde. I attempted to determine how much had been formed; but I could not get a filter, and threw it all into the funnel with a larger filter paper, and let it drain off, and when it had stopped,— I do not

know who weighed it,— but the mass weighed a little over a pound; and then I put it into a covered dish, and let it stand to see if it would spread any more, and from day to day I could remove a few drams of liquid, and then it gradually got down to a few ounces. Then I left the cover of this dish off; and it all hardened up, the mass weighing perhaps an ounce.

MR. TAYLOR.— When polymerised, about 70 per cent. of it had evaporated?

DR. HARRINGTON.— Yes, sir.

THE PRESIDENT.— I was induced to ask this question from the fact of my wondering whether this 40 per cent. solution had any value as a germicide evaporated in a room; and this occurred to me, having observed its deodorizing effect under severe conditions,— a patient in quarantine in whom a necrosis of tissue was going on very rapidly, and in the presence of which you could scarcely breathe, the odor was so very bad. I directed the placing of a saucer, filled with the 40 per cent. solution of formalin, under the bed, when diluted so that the patient could bear it. It was continued; and this odor, which was so unbearable all over the room, was completely dissipated. It was the most wonderful effect I ever observed, and I was wondering whether any experiments had been made to see whether it had any germicidal action under those conditions.

PROFESSOR HARRINGTON.— I think Dr. Doughty in New York did some work in that way. He put the formalin in open dishes in the room before he undertook his experiment, and he found that it did have germicidal action; but it was so comparatively slight that he felt that he could not recommend it.

A MEMBER.— I should like to ask, Mr. President, if any one has made any experiment with spraying formaldehyde, and using it in that manner,— a method that has been recommended.

THE PRESIDENT.— Has any one had any experience in spraying a 40 per cent. solution of formaldehyde?

MR. TAYLOR.— That has been used in Philadelphia, advocated by Dr. Abbott; but I believe it has been abandoned.

A MEMBER.— Mr. President, I can report one case of an extreme nature where a very weak solution of formaldehyde was used by the

ordinary spraying apparatus, destroying the whole matter at once. It was used with great success.

THE PRESIDENT.— Are there any more remarks to be made on the subject? One gentleman has gone whom I hoped to ask to say something concerning our next meeting. I presume our next meeting will be held at Mr. Ellis's farm in April. If there is no further business to come before the meeting, a motion to adjourn will be in order.

Adjourned.

PUBLISHERS' DEPARTMENT AND BOOK NOTES.

In this department the publishers will include notices of such subjects, germane to the scope of the *Journal*, as would seem to be of interest to its readers, but which are not a part of the transactions of the Association.

BOOK NOTES.

Among recent publications, one of particular interest in the present war crisis is *The Wound Dresser* (Boston: Small, Maynard & Co.). This book is a series of letters written during the war of the rebellion by Walt Whitman, while he was in the hospitals at Washington, voluntarily devoting himself to that work of humanity which is now so well known. Written without the idea of future publication, these letters are faithful and graphic accounts of daily scenes among the sick and wounded.

In the first flood of patriotic enthusiasm, we are all too prone to forget that war means more than martial display and achievement,— that it means also the pathos of suffering and death; and this is a phase of the question which humanity demands that we keep constantly before us. *The Wound Dresser* is of peculiar interest and value in throwing side-lights upon such important matters as the inadequacy of the old war hospitals, the sad lack of equipment, the neglect of subordinates, and the untiring, unselfish, and sympathetic efforts of the surgeons. It may fairly be called a contribution, not only to general literature, but to the authentic records of the progress of military

surgery. It is a layman who writes, to be sure; but the modern surgeon, reading his words, will perhaps value them all the more highly on account of the novel and unexpected lights which they throw upon the methods of relieving disease and wounds in times of extreme stress and danger.

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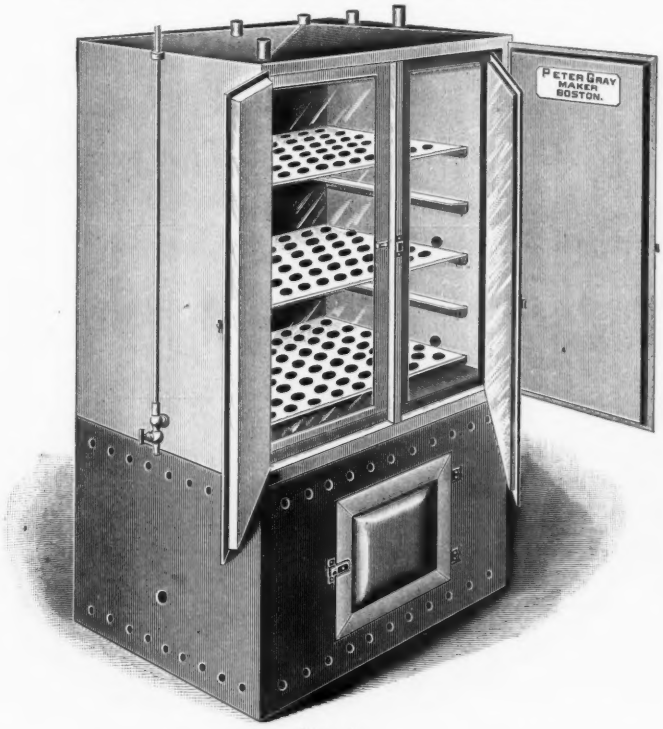

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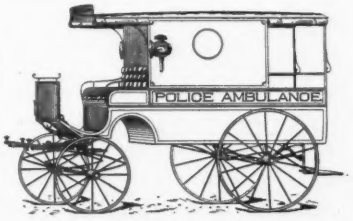

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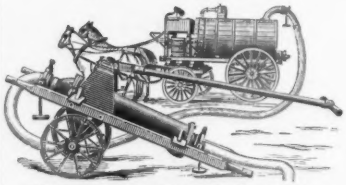

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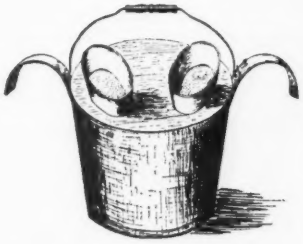

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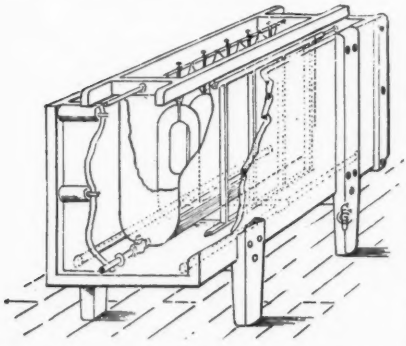

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